LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
Critical Criteria Meeting No. 1 Summary

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
September 20-21, 2006

Attending

Name	Organization	Name	Organization
Alan Hall	Acceler8	Lee Wiseman	CDM
Becky Hachenburg	Acceler8	Lena Rivera	CDM
Bill Taylor	CDM	Lisa Kreiger	SFWMD
Bob Howard	SFWMD	Mark Fordham	JMJV
Brenda Mills	SFWMD	Mark Long	Acceler8
Bruce Phillips	Acceler8	Martin Falmlen	USACE
Camille Dominguez	Acceler8	Mike Schmidt	CDM
Chad Kennedy	FDEP	Nimmy Jeyakumar	Acceler8
Chuck Price	JV/Jacobs	Northon Jocelyn	SFWMD
Craig Wilson	SFWMD	P.K. Mathai	JV/Jacobs
David Collins	CDM	Patrick Gleason	CDM
David Unsell	SFWMD	Razi Quraishi	Jacobs
Denise P. Jones	Acceler8	Rich Virgil	SFWMD
Don Nuelle	SFWMD	Rodrigo Musalem	SFWMD
Ed Brown	USACE	Sam Honeycutt	USACE
Eric Hughes	US EPA	Scott Huebner	SFWMD
Ernest Sturtz	CDM	Sean Williams	Acceler8
Frank Nearhoof	FDEP	Sergio Gaitan	CDM
Fred Snider	JMJV	Shelley Yaun	FDEP
Garry Ritter	SFWMD	Steve Martin	CDM
Gerry Siekerka	JV/Jacobs	Steve Partney	FDEP
Giana Wong	CDM	Steve Schubert	USFWS
Glenn Fernandez	SFWMD IMC	Steve Whiteside	CDM
Greg Hillebrenner	Acceler8	Susan Coughanour	SFWMD
Greg Lawrence	CDM	Tammy Martin	RCT/CDM
Jeff Kivett	Acceler8	Temperince Morgan	SFWMD
Jennifer Leeds	Acceler8	Terry Peters	SFWMD
Jerry Krenz	SFWMD	Tim Stanley	SFWMD
John Haapala	JMJV	Tom Nichols	CDM
John Ladner	CDM	Tom Nye	CDM
John Loper	SFWMD IMC	Tori White	USACE
Kirk Westphal	CDM	Tracy Robb	FDEP/Acceler8

Name	Organization	Name	Organization
Kyle Husted	CDM	Victoria Foster	US EPA
Larry Schwartz	CDM	Yanling Zhao	SFWMD IMC
Laurene Capone	Acceler8		

Proceedings:

Wednesday, September 20, 2006

- Opening Remarks and Introductions presented by Mark Long
- Meeting Purpose and Schedule presented by Mark Long
- Project Overview/Update presented by Mike Schmidt
  - Project Goals
  - Project Components
  - Data Availability & Evaluation
  - Conceptual System Schematic
    - Preliminary Input Data USGS/DBHYRO: 1972-1989
    - Basic Flow Logic
    - Model Input
    - Preliminary Configuration
    - Preliminary Water Budget Results
  - Preliminary Phosphorus Loading Contributions
    - Selected Water Quality Stations
    - Conceptual TP Load Reduction-2010 Land Use & BMPs
    - Water and TP Budget Conclusions
  - Taylor Creek Reservoir
    - Taylor Creek Reservoir Constraints and Issues
      - The reservoir shall capture the greatest volume of water and mass of total phosphorus possible for the available funding
      - The reservoir shall be sited on SFWMD land
      - The use of the Okeechobee County school board lease on the southern portion of Taylor Creek's west bank should be avoided
      - The reservoir shall be located and designed with public safety as a primary consideration
      - Only lands west of the existing access road shall be used in the footprint of the reservoir
      - Consider potential impacts to offsite lands (wells, septic tanks, GW), therefore, buffers and the seepage management system setbacks must be provided
      - Possible groundwater contamination located near the southern residential communities should be considered
      - Avoid Impacts to the 36-inch gas main
      - Adverse effects on the Taylor Creek Algal Turf Scrubber System shall be avoided

- The potential discovery of archeological resources may require the formulation of additional considerations
- Avoid impacts to existing wetlands if possible
- The outlet should be located to improve operational flexibility and residence time
- Reservoir levees should travel in straight lines and if possible form a rectangular shape to reduce costs
- The reservoir should have internal levee(s) to reduce wind fetch and wave run-up
- Internal levee(s) should also be considered to increase residence time
- Onsite manure and legacy TP must be addressed

- Reservoir Alternatives
  - Configuration 1 (see attached presentation)
  - Configuration 2A (see attached presentation)
  - Configuration 2B (see attached presentation)
  - Configuration 3 (see attached presentation)
  - Configuration 4 (see attached presentation)

- Lakeside Ranch STA
  - Lakeside Ranch STA Constraints and Issues
    - The STA should work in coordination with Taylor Creek Reservoir-STA and Nubbin Slough STAs to Maximize TP Removal (recirculation could be a major issue)
    - Onsite manure and legacy TP must be addressed
    - Wetlands and habitat should be incorporated and enhanced if possible
    - Topographic variation must be considered in the design - Substantial regarding
    - Conveyance improvements for the canals to the STA are constrained by limited easements and the railroad
    - Consider potential impacts to offsite lands (e.g., building foundations, wells, septic tanks, GW), therefore, buffers and the seepage management system must be provided
    - STA levees should travel in straight lines and if possible form a rectangular shape to reduce costs
    - Avoid impacts to the 36-inch gas main and fiber optic line
  - STA Alternatives
    - Configuration 1 (see attached presentation)
    - Configuration 2 (see attached presentation)
    - Configuration 3 (see attached presentation)
    - Configuration 4 (see attached presentation)
- Test Cell Objectives
  - Obtain seepage data (recoverable and non-recoverable)
  - Evaluate seepage control systems including soil-bentonite cutoff wall

  - Evaluate stability of onsite materials
  - Determine potential construction issues relative to dewatering and excavation
- Questions/Comments from audience
  - USGS is doing a load study: 2004 – 2005.
  - Need to coordinate pumping water out of seepage ditches around Lake Okeechobee. Concerned about stability. Don't want to lower water levels next to the lake levee.
  - Gary Ritter – pump back from L63N when other creeks are dry?
  - Is Taylor Creek the only creek captured?
  - Is anything from Nubbin Slough being captured?
  - Flows will be sent from reservoir to the STA to keep it wet.
  - How do flows get back to the lake? Flow by gravity as much as possible. Pump when necessary.
  - PS 135 – Just awarded a contract to renovate this station.
  - Suggests that 50% reduction in TP from voluntary BMPs is too optimistic.
  - The TCR will take out Wolf Creek, a 1st order stream. Have we talked to FDEP about permitting this? Is there a stream relocation planned for mitigation? FDEP won't accept just removing a stream.
  - Have we looked at sediment transport associated with this system? Need to look at because it can harm performance.
  - Wolf Creek was channelized back in the '60s and extended north to service farms.
  - Have you considered taping into the nearby gas main to use natural gas to power pumps?
  - Levees are up to 2.5 – 2.7 times the heights above design water level. Other reservoir sites have higher levees than originally proposed.
  - Has there been a public presentation of alternatives?
  - What's the plan for the rest of the land to the east of the reservoir?
  - What is the topography of the site? Ranges from 40' to 15' at the creek.
  - Can you use some of the natural high spots to help mitigate the dam break analysis?
  - What is the mean CFS coming down Taylor Creek?
    - Mean: 50 – 100 CFS
    - Peaks: 800 CFS

    Concerned the Taylor Creek doesn't have enough water to keep things hydrated.
  - Can we move Alt. 4A north to get out of the old meanders of Wolf Creek?
  - Hydromentia site – 70 acres. Pilot is about 25 acres for ATS.
  - If we move the road - need to vacate the ROW. Electrical is being upgraded from 1 phase to 3 phase. Provide alternate access to neighbor.
  - Is the project in NAVD or in both? The plans will be NAVD88. Difference is 1.33±.
  - Do all the flows to the STA come in from 63N? Yes.

- Does the outlet from the STA go into the Rim Canal? Yes.
- What types of structures for the STA?
- L64 existing cross-section is small.
- How much STA storage in acre feet? 2400 acres x 1.5.
- SFWMD has a standard detail for weir gate.
- PMP storm will result in a STA discharge.
- Each of these systems will have an emergency overflow.
- Why is reservoir spillway not used? We have not included a spillway in the models because one design constraint included no discharge during the PMP
- Why is the reservoir constrained to not discharge in the PMP?
- How familiar are we with the redesign of the other levees?

- Site Visit

Thursday, September 21, 2006

- Meeting Purpose and Schedule presented by Mark Long
- Acceler8 Recreation – LOFT presented by Jerry Krenz
  - Public Recreational Access and Use Policy
  - Design helps control access
  - Standard designs
  - Guidelines
  - Access design not activity management
  - Facilities support many activities
  - Security
  - Liability
  - Who Pays
- Introductions presented by Mike Schmidt
- Existing Conditions (Hydrologic and Phosphorous Budgets, Geology, Land use, Groundwater, and Seepage) and Project Goals presented by Mike Schmidt
- Hydrology, Hydraulics, and Water Quality
  - Groundwater model presented by Lee Wiseman
    - Questions/comments from audience
      - With slurry wall fully penetrating, how far offsite did mounding extend? No mounding.
      - 10.6 CFS captured by seepage controls with seepage control on west & south.
      - SFWMD – Going to NAVD. Will report be in NAVD?
      - What is the depth of curtain wall? About 40'.
      - What is water depth in test cells? 18'.
      - Is a sensitivity analysis needed?
      - Any additional investigation of soils needed? There will be additional soils investigation.

- Did we consider MIKE SHE model?
- What was the accuracy of the topographical survey? Onsite - accuracy is ± 0.3′. Off-site USGS topo. We will need to get additional info on identified problem areas.

- Hydrologic and Hydraulic model presented by Tom Nye
  - Questions/comments from audience
    - How large were calibration storms? About 10″ storms.
    - As per DCM, must include an uncontrolled spillway in reservoir.
    - Can we calibrate over a longer period? Only needed to calibrate to one event and check one event.
    - What is correlation factor for model calibration & validation? Reviewer believes this is important information. CDM should calculate and include in the BODR
    - How did we look at surface water and groundwater interaction?
    - Have we compared continuous simulation from SWMM with WAMVIEW results?
    - Why did we use the WAMVIEW model?
    - H & H team is still analyzing Reservoir Alt. 4.
    - Stage triggers will be used to turn pumps on and off and to close and open gates.
    - Discuss in BODR:
      - seasonal operation
      - seepage system pumps
      - spillway water levels
      - TCR & the PMP
    - Need to evaluate a case where the PMP is not retained. Confirm the method in DCM.
    - Coordinate with Mark regarding report review schedule to ensure timely reviews.
- Water Quality and STA Models presented by Larry Schwartz and John Ladner
  - Questions/comments from audience
    - Consider ATS water use upstream of Taylor Creek. How much flow?
    - ATS vs. STA $/mton TP removed
    - Design life: 50 vs. 100 years
    - Jeff Kivett suggested evaluating a single flow path vs. three.
    - Jeff Kivett stated that system operational flexibility is less important than cost.
    - Jeff Kivett questioned the reasoning for a max. depth of 4 feet. He suggested designing for a lower max. depth.
    - List the compaction criteria for earthwork in the BODR.
    - Need to obtain bottom-opening weir gate details from SFWMD.

        - Consider an east to west seepage through cells based on topography variations.
        - Monitor & gage L-47 to determine if flow capture is worth it.
        - Must include analysis of 2010 conditions as well as existing conditions in BODR. SFWMD will provide their 2010 WAMVIEW results.
        - Eric with the EPA suggested including in the BODR the water quality data used, especially from the last 6 or 7 years.
        - Change logic reference in STA from maximum level to treatment level as a trigger.
        - What drives the decision regarding minimum level of water in the reservoir?
        - Need to provide a cost justification for keeping water in the reservoir.
        - Provide justification for the berm height at the STA.
        - Need to provide justification for the 4′ maximum water level.
        - Must cut down the cost. Perform cost benefit analysis.
        - Subdivide cells where grading is difficult.
        - How will flow and level be monitored?
        - Will fill be compacted?
        - Make sure using SFWMD standard details.
  - System Model presented by Kirk Westphal
    - Questions/comments from audience
      - Check on actual max. water depth in STA. It may be considerably lower than 4 ft.
      - How was the *k* value derived?
      - Jeff Kivett stated that the basis for requiring a minimum water level in the reservoir should be included in the BODR
- Dam and Reservoir Design presented by Steve Whiteside and Tom Nichols
  - Dam design criteria/Embankment type selection
  - Embankment materials
  - Foundation
  - Slope stability
  - Settlement
  - Erosion protection
  - Questions/comments from audience
    - Will dewatering activities affect wells offsite?
    - Case 3 is not required for design.
    - Probable maximum wind sounds too high. 200 mph sounds too high.
    - Reduce freeboard from 14′
    - Document residence time value of internal levee
    - Does the internal berm provide another purpose than just to cut down on waves? Provide data and justification.

- On outside of levee - need a swale between outside toe of levee and roadway section.
- Have we considered a parapet well?

- Water Control Facilities and Canals presented by Mike Schmidt
  - Intake/Outlet
  - Spillways
  - Culverts
  - Gates
  - Canals
  - Questions/comments from audience
    - Will all vertical elevations be in NAVD?
- Pump Stations presented by Steve Martin
  - Pump Selection
  - Seepage or Flood Control Criteria
  - Power
  - Structural/Architectural
  - Questions/comments from audience
    - Will we look at using gas to power pump stations?
    - Can we do without one pump station?
    - Can pumps be standardized?
    - Compare S-135 or L-47 - through the levee issues, over levee requires high head pumps, cost
    - How can you go over the levee without impacting the road? Maybe use a ramp over the pipe.
    - Decide if STA flow is generally less than 200 cfs, can we limit LD4 to 200, LR STA to 200-300 cfs & then reduce S191B to 100-200 cfs & 100 cfs at L-47 (S191C).
    - Can you use one pump station with extra piping instead of two pump stations?
    - Can we reduce the number of pumps?
    - Will be able to apply modeling to pump sizing and numbers of pumps?
    - Cost compare vertical vs. submersible pumps
    - Decide on seepage return pumps, especially for LR STA
    - Pumps that are outside should be enclosed.
    - District's major P.S. guidelines don't apply to these pumps.
    - District has guidelines for minor P.S.
- Breakout Sessions

Hydrology and Hydraulics of Water Control Facilities and Canals with Tom Nye

- Water Quality and STA with Larry Schwartz, John Ladner, Giana Wong, Lena Rivera, Mike Schmidt
- Dam and Reservoir Design Criteria with Steve Whiteside, Lee Wiseman, Tom Nichols

- Pump Stations with Steve Martin and Ernie Sturtz
- Preliminary Operations Plans with Mike Schmidt, Kirk Westphal, Lena Rivera

▪ Breakout Session Presentations
  - Hydrology and Hydraulics of Water Control Facilities and Canals by Tom Nye
    - Dam design – an uncontrolled spillway will have to be part of the design. It will discharge into Wolf Creek.
    - Internal Structures of STA Design
      - Concern about gates inside a concrete structure.
      - How will flows be measured?
    - Use 0.02 ft/day for sunny day evapotranspiration
    - Talk with STA Manager from SFWMD regarding cell configuration.
    - Wolf Creek will have to continue to flow to the south.
  - Water Quality and STA by Larry Schwartz
    - Does TP data go back 40 years?
    - Should be using 2010 TP concentrations
    - Should run both historical & 2010 conditions.
    - Consider a variability analysis with a % of BMPs in place.
    - Value engineer cell layout.
    - Consider removing or not building the most expensive cells.
    - Consider other uses for most expensive cells.
    - Alt. 4 STA with existing land use
Alt. 4 STA w/ 2010 land use
Alt. 5 STA w/existing land use
Alt. 5 STA w/2010 land use
    - Additional field data on Manning's n
    - Establish a narrower range of incoming flow
    - Can the berm height be lowered?
    - How much water will it take to keep the STA hydrated?
    - Look at optimal floway – for normal operation. Put higher flows in other cells with minimal grading.
    - Would like to look at background on TP inputs to lake. Total TP to Lake Okeechobee. Reference that document in the BODR.
    - Discuss use of PMP on the STAs. Is this really applicable?
    - DCM 2 – Design Criteria for STAs. For low hazard.
    - Do we just need 2' interior overflows?
    - Consider loss of volume due to dense vegetation
    - Design life – 50 yrs
    - Operations plan – consider lack of power impacts
    - Get C-43 (Reservoir) and C-44 (STA) test cell water quality data from Mark
    - Run ranges on sensitivity of *k* values for DMSTA2
    - Need to identify water quality station locations
    - SFWMD, FDEP & EPA would like to review water quality monitoring plans

- Use update protocol to verify that contaminant sampling doesn't need to be update
  Talk to Bob Kukleski & Bob Taylor RE: audits
- Identify T&E issues – for test cells & full construction must be done quickly
  Cara Cara
- Check L-47 for need for manatee access devices

– Dam and Reservoir Design Criteria by Steve Whiteside and Tom Nichols
  - Need to define footprint of reservoir alternatives.
  - What slope stability and seepage software should be used?
  - Soil cement specifications
  - Interior wave bench
  - Parapet wall
  - Outlet works
  - Emergency spillway
  - Overtopping/freeboard criteria
  - Depth of soil-bentonite cutoff wall and construction techniques
  - Borrow sites
  - Chimney/blanket drain
  - Toe drain
  - Geotechnical instrumentation
  - Settlement
  - Crest width
  - Perimeter road
  - Seepage collection canal slopes and need for slope protection
  - Liquefaction analysis
  - Dambreak analysis
  - Wave run-up analysis
  - Upstream and downstream slope protection
  - Intersection of cutoff wall with structures
  - Seepage along penetrations
  - Need detailed cross sections and subsurface information in the report.
  - The group discussed some of the above items did not have time to discuss all of them. The following is a summary of the items discussed.
    - Soil cement. It was discussed that cement percentages of 8, 10, 12, and 14 percent should be evaluated. The lifts in the stepped section of the soil cement slope protection are typically 12 inches thick. At the EAA project, Barnard Construction has requested that they be able to stack three lifts on top of each other to have 3-foot steps rather than 1-foot steps to reduce the amount of formwork. The first step would be 1 foot high to avoid a steep drop-off adjacent to the crest road. At the Taylor Creek test cells, installation of the plate section of the soil cement will be tested on a 2.5H:1V slope.

- Parapet wall. CDM should consider including a parapet wall to reduce the required amount of embankment fill. At EAA, they are considering a 2-foot-high wall. The contractor has requested possibly using a 7-foot-high wall. At EAA, a parapet wall is cost effective because of the high cost of borrow. It was decided that CDM should choose a parapet wall height (probably 3 feet) and do a cost analysis to see if it is cost effective. Fish and Wildlife may have concerns about blocking in animals in the reservoir.
- Outlet works. The reservoir will need to have a low-level outlet(s) to drain the reservoir. Discussion was deferred to the structures breakout group.
- Emergency spillway. The reservoir will need to have service and emergency spillways. Discussion was deferred to the structures breakout group.
- Overtopping/freeboard criteria. It was decided that no overtopping or over-splash should be allowed. The District will be performing overtopping evaluations at the other test cells. It was also discussed that the Agricultural Research Service laboratory in Stillwater, Oklahoma could be engaged to do some model tests. We discussed compaction criteria. The freeboard design should be based on Cases 1 and 2 in the DCM and not on Case 3. Options were 95% of Standard Proctor, 98% of Standard Proctor, and 95% of Modified Proctor.
- Depth of soil-bentonite cutoff wall and construction techniques. The soil-bentonite wall will extend to the clayey sand confining layer that is encountered at depth ranging from about 35 to 60 feet. The depth is about 60 feet at the test cells location. In the test cells, CDM plans to test two walls – one extending to the confining layer and one extending about 35 to 40 feet below ground surface. This partially penetrating wall will extend through some shallow, thin clayey sand layers. The wall will be 3 feet thick. If the wall is built in two stages, the wall below ground surface would be 5 feet thick, and the wall through the embankment would be 3 feet thick and extend into the lower wall.
- Crest width. The minimum crest width is 12 feet. CDM is currently showing 16 feet. There are issues with the 50-50 cost sharing between the District and the Corps if a width larger than 12 feet is used. At the C-43 project, it has been decided that the crest width be 14 feet with a 12-foot-wide, 12-inch-thick RCC layer on the upstream side of the crest and 2 feet of fill on the downstream side. The Joint Venture will provide information on the decision process to CDM.
- Perimeter road. The DCM requires a 24-foot-wide perimeter road. The C-43 project includes a 14-foot-wide road with drainage swales on both

sides. CDM needs to start with the 24-foot-wide road and include a cost-savings analysis in the BODR to justify a smaller road.

  - Seepage collection canal slopes and need for slope protection. CDM is using 3H:1V slopes for the seepage collection canals.
  - Seepage along penetrations. The outlet pipes should have concrete cradles extending to the pipe spring line. Anti-seepage collars should not be used. Filter diaphragms will be installed around the pipes to control seepage.

- Pump Stations by Steve Martin
  - Check power supply for new pump stations and structures. Check to see if it is Glades Power or FPL.
  - Look at diesel pumps versus electric pumps.
  - GS123 guidelines & reduce #
  - LD4 dredge channel to pump, locate N of Hwy 98
  - S191C over levee: evaluate for structural & geotech. The better option is S135

CDM

Lake Okeechobee Fast Track (LOFT) Project Basis of Design Report (BODR)

Critical Criteria Meeting

September 20 and 21, 2006

Agenda – Day 1

- Project Overview and Update
  - Goals
  - Project Components and Configurations
  - Progress to Date
  - Site Conditions and Water Budget
  - Utilities and Access
  - Special Considerations and Permits
    - Regulatory
    - Environmental
    - Cultural Resources
    - Recreation

CDM

Project Goals

- Achieve maximum total phosphorous removal for the available budget
- Implement the Lakeside Ranch STA and Subbasin Rerouting Project components by end of 2009 and Taylor Creek Reservoir by 2010

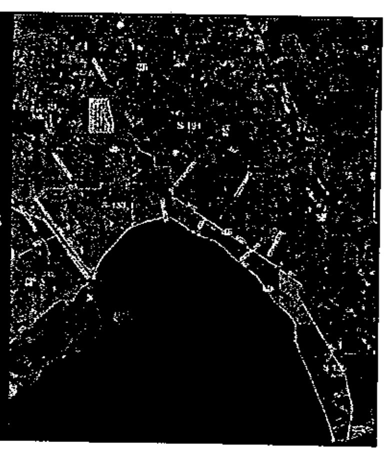
CDM

Project Components

- Taylor Creek Reservoir
- Lakeside Ranch STA
- S-133/191 Subbasin Re-routing
- S-154 Subbasin Re-routing

CDM

LOFT Project Components



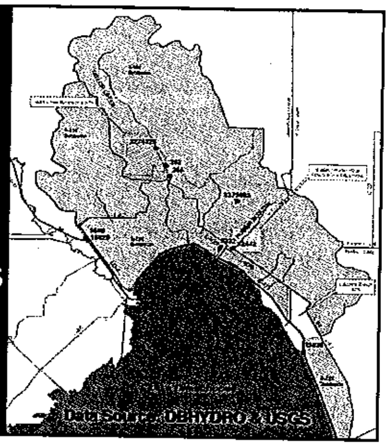
CDM

Impoundments

- Taylor Creek Reservoir
  - Constraints
  - Features
  - Configuration Options
  - Treatment Options
- Lakeside Ranch STA
  - Constraints
  - Features
  - Configuration Options
  - Treatment Options

CDM

Water Budget Flow Stations

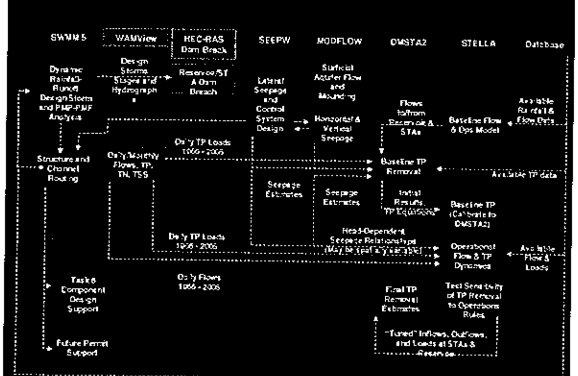


CDM

Data Availability & Evaluation

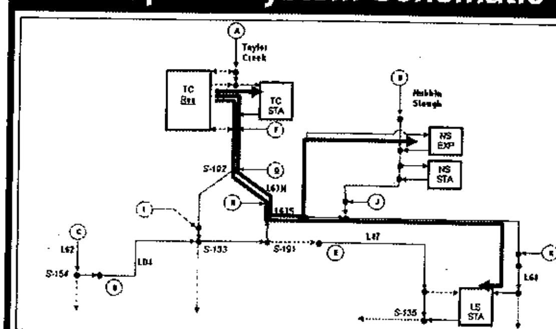
- Obtained water quality data from DBHYDRO for project area
- Period of Record Analyzed: 1972-1989 & 2004-2005
- Determined land use and contributing area per sub-basin
- Reviewed published values for areal pollutant loading rates (land use specific)

CDM



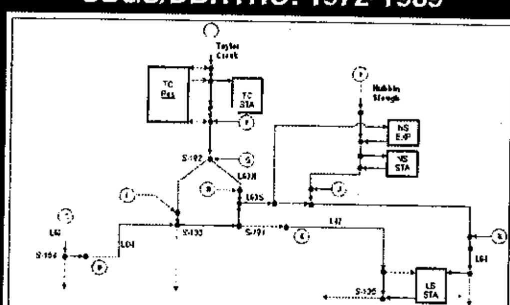
CDM

Conceptual System Schematic



CDM

Preliminary Input Data
USGS/DBHYRO: 1972-1989



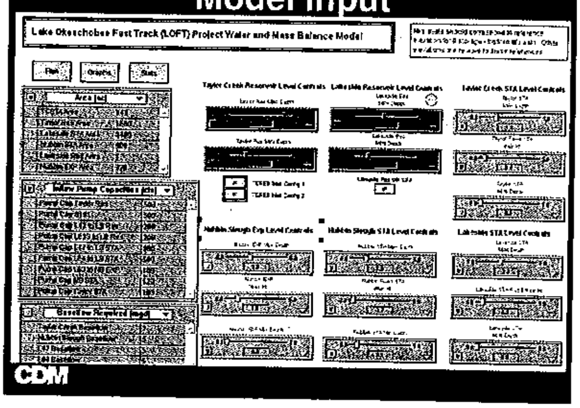
CDM

Basic Flow Logic

- Reservoir
  - Water pumped into reservoir whenever it is below max water level.
  - Water released from reservoir when any STA water level reaches specified trigger (e.g. 30% of storage above weir)
  - No outflows allowed if water is below minimum specified level.
- STAs
  - Water pumped into STAs whenever they are below design treatment water level.
  - Water released from STAs according to weir equations
    - Gates are partially closed (weir raised) when no flow is going into an STA
  - Model constrained to leave specified baseflow in streams/canals

CDM

Model Input



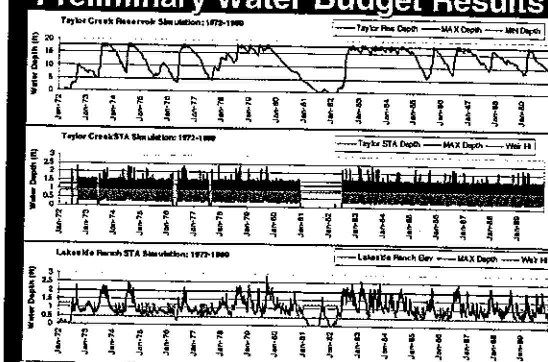
CDM

Preliminary Configuration

- Surface Areas:
  - Reservoir: 1,600 to 2,000 acres
  - Taylor Creek STA: 142 acres
  - Nubbin Slough Critical STA: 979 acres
  - Nubbin Slough Expansion: 330 acres
  - Lakeside Ranch STA: 2,400 acres
- Reservoir operating range: 4 to 5 ft min, 15 to 18 ft max
- STA operating range: ~0.5 ft min, 1.5 ft design, 2 ft max
- Pump capacities: 100 – 500 cfs
- Reservoir releases triggered when STAs go below 10% of storage above weir
- Rerouted flows from S-154 and S-133 directed to L63S
- Reservoir intakes at northeast or southeast corners

CDM

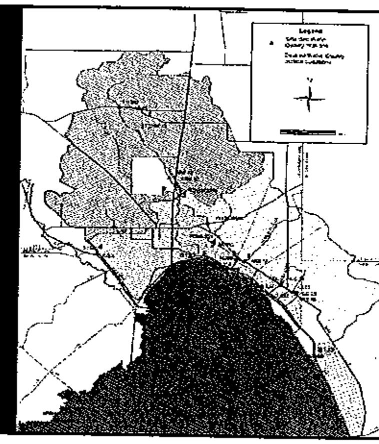
Preliminary Water Budget Results



CDM

Selected Water Quality Stations

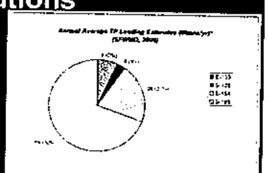
Data Source: DBHYDRO

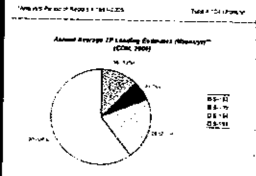


CDM

Preliminary Phosphorus Loading Contributions

- Two independently performed analyses
- CDM's overall watershed contributions (133 Mtons/yr) are 7% higher than SFWMD's estimate (124 Mtons/yr)
- Slight variations likely due to differences in period of record analyzed





CDM

Conceptual TP Load Reduction- 2010 Land Use & BMPs

- Per SFWMD's request, CDM provided draft conceptual annual average TP removal estimates using STELLA and DMSTA2 for LOFT treatment components in August 2006
- Data Source: SFWMD TP remaining concentrations and loads for each sub-basin for the time period 1991-2005 (per 2010 projected BMPs and land use conditions)
- Per SFWMD's estimates, 55 Mton/yr remain available for treatment

CDM Conceptual Results:

Component	Processed Annual Flow Volume (Ac-Ft/Year)	Low Range Annual TP Reduction (Mtons/Year)	High Range Annual TP Reduction (Mtons/Year)
Taylor Creek Reservoir	17,000	2.0	4.3
Lakeside Ranch STA	63,700	10.2	10.9
Total	80,700	12.2	15.2

**Total of 12 to 15 Mtons/year of TP projected to be removed out of 55 Mtons/year available for treatment using future SFWMD concentrations*

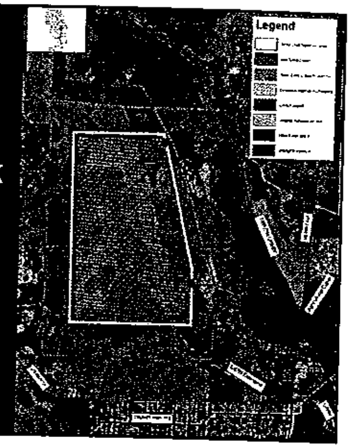
CDM

Water and TP Budget Conclusions

- Final recommendations contingent on processing full input record (simulated) from 1965-2005
- It appears that a reservoir with a footprint of 1,600 acres will be sufficient to keep the STAs hydrated except in cases of extreme drought – seepage pump back may be needed
- Amount of water captured is sensitive to operating rules, intake location, and reservoir size
- Metrics of water capture and phosphorus removal will be used to "tune" the configuration and triggers. Final estimates of phosphorus analysis will rely on DMSTA

CDM

Taylor Creek Reservoir



CDM

Taylor Creek Reservoir Constraints and Issues

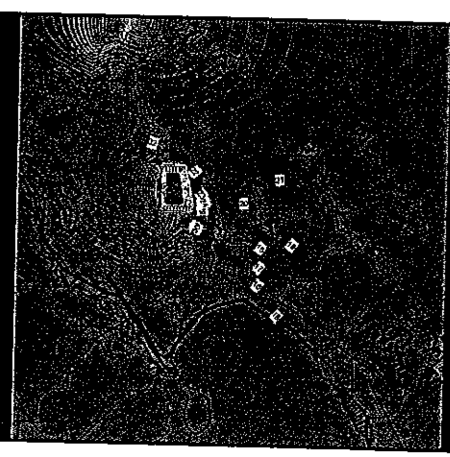
1. The reservoir shall capture the greatest volume of water and mass of total phosphorus possible for the available funding
2. The reservoir shall be sited on SFWMD land
3. The use of the Okeechobee County school board lease on the southern portion of Taylor Creek's west bank should be avoided
4. The reservoir shall be located and designed with public safety as a primary consideration

CDM

Taylor Creek Reservoir Constraints and Issues

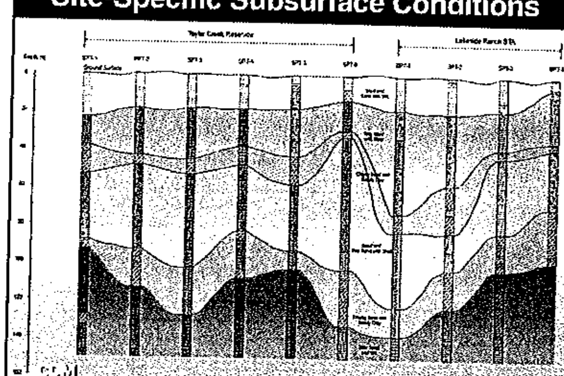
5. Only lands west of the existing access road shall be used in the footprint of the reservoir
6. Consider potential impacts to offsite lands (wells, septic tanks, GW), therefore, buffers and the seepage management system setbacks must be provided
7. Possible groundwater contamination located near the southern residential communities should be considered
8. Avoid Impacts to the 36-inch gas main

CDM



CDM

Site-Specific Subsurface Conditions



CDM

Taylor Creek Reservoir Constraints and Issues

9. Adverse effects on the Taylor Creek Algal Turf Scrubber System shall be avoided
10. The potential discovery of archeological resources may require the formulation of additional considerations
11. Avoid impacts to existing wetlands if possible
12. The outlet should be located to improve operational flexibility and residence time

CDM

Taylor Creek Reservoir Constraints and Issues

13. Reservoir levees should travel in straight lines and if possible form a rectangular shape to reduce costs
14. The reservoir should have internal levee(s) to reduce wind fetch and wave run-up
15. Internal levee(s) should also be considered to increase residence time
16. Onsite manure and legacy TP must be addressed

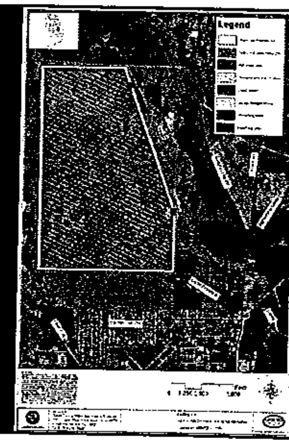
CDM

Reservoir Features

Reservoir Parameter	Alt 1	Alt 2A and 2B	Alt 3	Alt 4
Pool Area (Ac)	2,745	1,600	1,600	2,000
Max Pool Depth (Ft)	12	18	18	15
Max Pool Volume (Ac-Ft)	32,000	28,800	28,800	30,000
Dam Height (Ft)	22	32	32	29

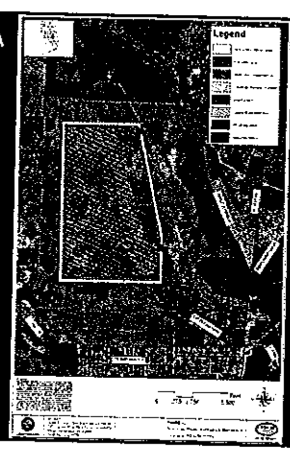
CDM

Alternative 1



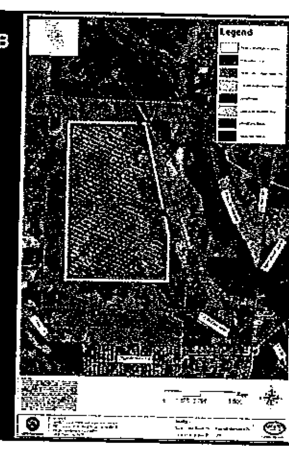
CDM

Alternative 2A



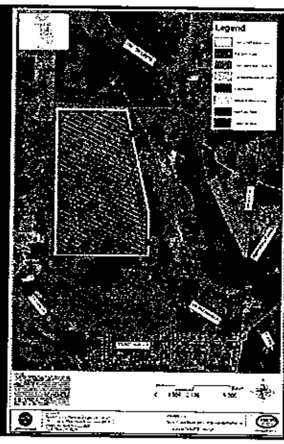
CDM

Alternative 2B



CDM

Alternative 3A

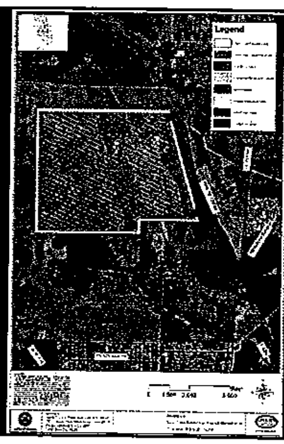


CDM

Alternative 3B

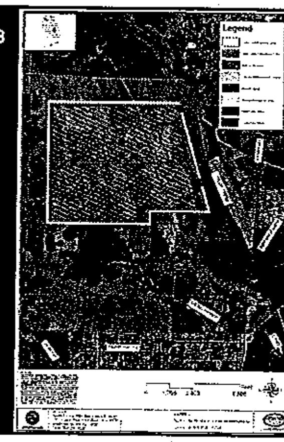
CDM

Alternative 4A



CDM

Alternative 4B



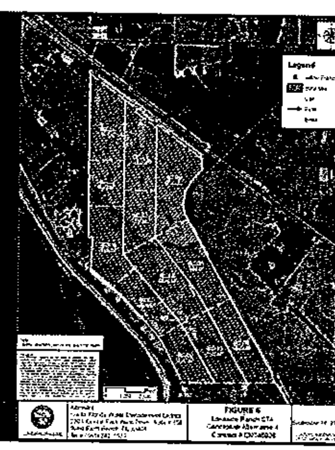
CDM

Taylor Creek Reservoir Treatment Options

- Maintain permanent pool in reservoir to achieve removal similar to wet detention (20 to 70 % TP)
- Add STAs
- Add ATSs
- Recirculate if needed

CDM

Lakeside Ranch STA



CDM

Lakeside Ranch STA Constraints and Issues

1. The STA should work in coordination with Taylor Creek Reservoir-STA and Nubbin Slough STAs to Maximize TP Removal (recirculation could be a major issue)
2. Onsite manure and legacy TP must be addressed
3. Wetlands and habitat should be incorporated and enhanced if possible
4. Topographic variation must be considered in the design – Substantial regrading

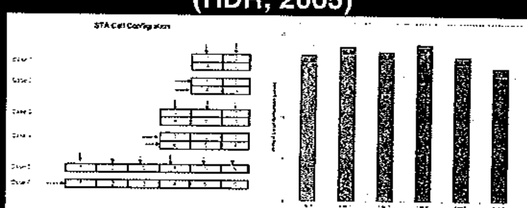
CDM

Lakeside Ranch STA Constraints and Issues

5. Conveyance improvements for the canals to the STA are constrained by limited easements and the railroad
6. Consider potential impacts to offsite lands (e.g., building foundations, wells, septic tanks, GW), therefore, buffers and the seepage management system must be provided
7. STA levees should travel in straight lines and if possible form a rectangular shape to reduce costs
8. Avoid impacts to the 36-inch gas main and fiber optic line

CDM

STA Cell Configuration Analyses (HDR, 2005)



- Higher annual load reduction with longitudinal flow (Cases 2 and 4)
- Similar annual load reduction for 4 cells versus 6 cells

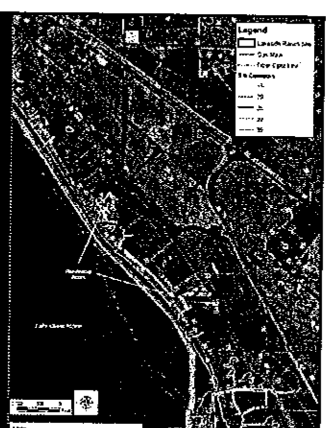
CDM

Lakeside Ranch STA Treatment Options

- STAs
- ATSs
- Add a permanent pool forebay
- Add a reservoir to capture and attenuate flows
- Recirculate as necessary

CDM

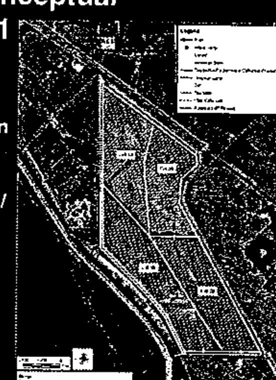
Lakeside Ranch Existing Site



CDM

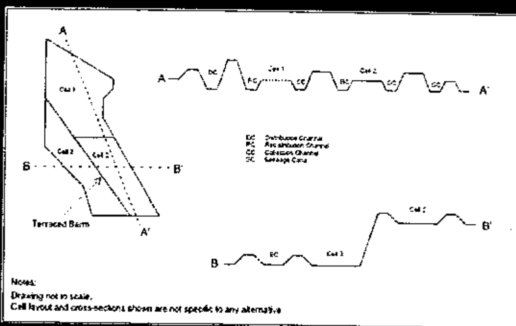
Lakeside Ranch Conceptual Alternative 1

- 4 Cells
  - 2 Parallel Flow Pathways with 2 Cells in Series
- Northwest Intake Location
- Distribution/Redistribution/ Collection Channels
- Discharge to L-47 to S-135
- Seepage Canal on West
- Terraced Berms at Elevation Drop



CDM

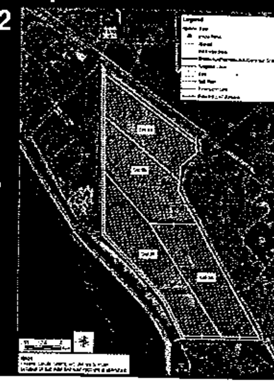
Conceptual Cross Sections



CDM

Lakeside Ranch Conceptual Alternative 2

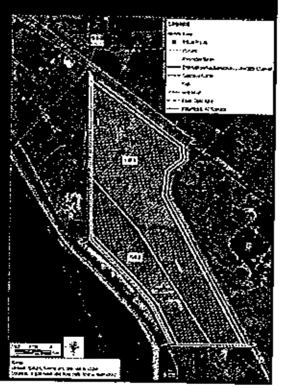
- 4 Cells
  - 2 Distribution Cells in Series followed by 2 Cells in Parallel
- Northwest Intake Location
- Distribution/Redistribution/ Collection Channels
- Discharge to L-47 to S-135
- Seepage Canal on West
- Terraced Berms at Elevation Drop



CDM

Lakeside Ranch Conceptual Alternative 3

- 2 Cells in Series
- Northwest Intake Location
- Distribution/Redistribution/ Collection Channels
- Discharge to L-47 to S-135
- Seepage Canal on West and South
- Terraced Berm at Elevation Drop
- Lower Aspect Ratio (L/W)



CDM

Lakeside Ranch Conceptual Alternative 4

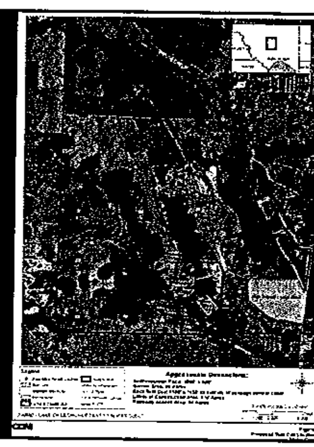
- 12 Cells
- Cell Configuration Based on Existing Topography
- Terraced Berms at Elevation Drop
- Distribution/Redistribution/ Collection Channels to be Determined
- Minimizes earthwork

CDM

Test Cell Objectives

- Obtain seepage data (recoverable and non-recoverable)
- Evaluate seepage control systems including soil-bentonite cutoff wall
- Evaluate stability of onsite materials
- Determine potential construction issues relative to dewatering and excavation

CDM



CDM

Agenda – Day 2

- Introductions
- Existing Conditions
- Project Goals
- Hydrology, Hydraulics, and Water Quality
  - Groundwater model
  - Freeboard evaluation, wave run up, wind setup & dam break analyses
  - Hydrologic and Hydraulic model
  - Water Quality and STA Models
  - System Model

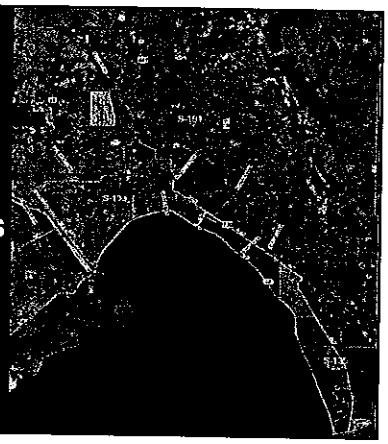
CDM

Agenda – Day 2

- Dam and Reservoir Design
- Water Control Facilities and Canals
- Pump Stations

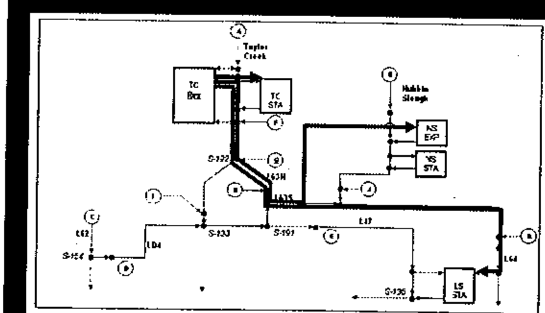
CDM

Existing Conditions



CDM

Conceptual System Schematic

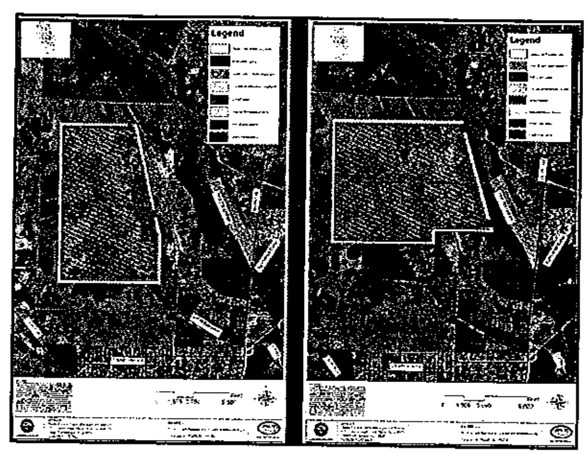


CDM

Project Goals

- Achieve maximum total phosphorous removal for the available budget
- Implement the Lakeside Ranch STA and Subbasin Rerouting Project components by end of 2009 and Taylor Creek Reservoir by 2010

CDM



Task 5.3 Surficial Aquifer Groundwater Model, Seepage, and Mounding Analyses

Lee P. Wiseman, P.E., BCEE

CDM

LOFT Groundwater Modeling Objectives

- Seepage Losses - TCR & LRSTA
- Offsite water table impacts
- Recharge/Baseflow

CDM

Summary of Presentation

- GW Modeling QA/QC Elements
- GW Modeling Overview/Timeline
- Development of 3-D Groundwater Model
- Calibration of GW Model
- Current Modeling Results

CDM

LOFT GW Modeling QA/QC Elements

- Weekly progress meetings
  - GW modeling team
  - Geotech/seepage modeling team
- Concurrent seepage modeling with geotechnical team
- MODRET/Regional/Local cross-checking
- STELLA/surface water model truth-checks

CDM

LOFT GW Modeling History/Timeline

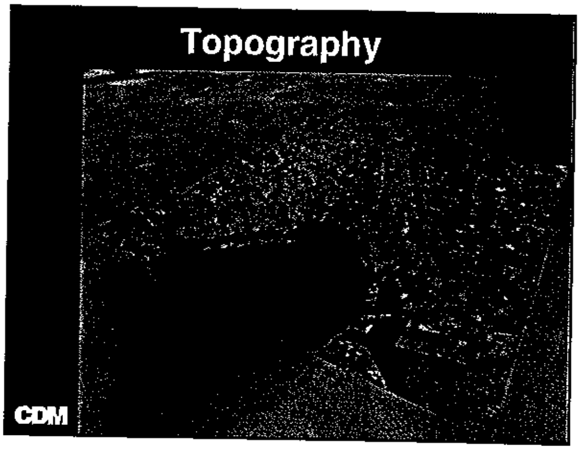
- Preliminary seepage estimates
- Regional model calibration
- Local model design scenarios
- Ongoing coordination with field & modeling (seepage)

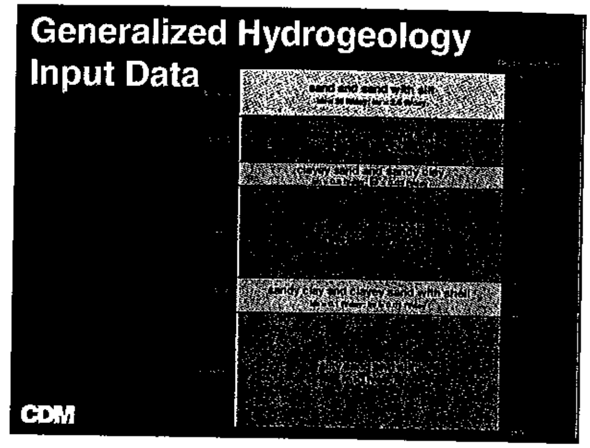
CDM

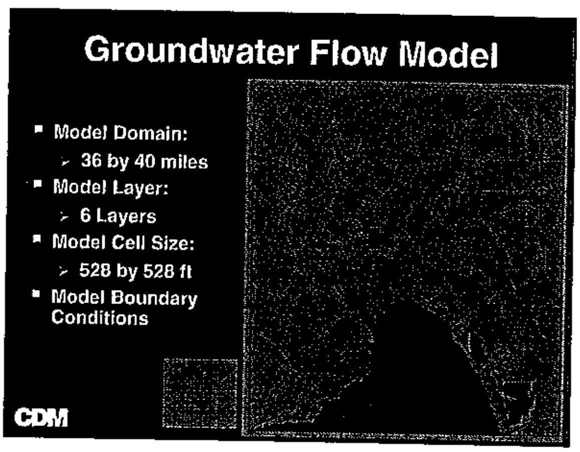
Different Data Types Used to Develop and Calibrate the Model

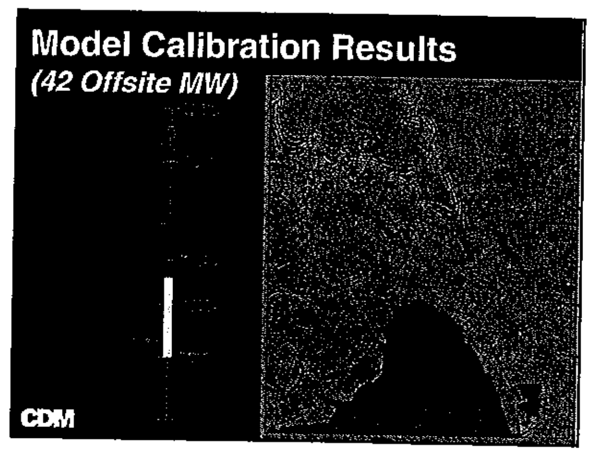
- Hydrogeology: Existing MWs, borings, reports & site-specific data
- Published meterological data
- GW elevs from 42 offsite and 53 onsite MWs
- SW elevs from 189 existing staff gauges
- SW discharge data for TC and KR
- Legal User Wells in SAS (565 wells, 161 users)
  - 62% of legal users associated with Ag uses
  - Total withdrawals: 27 MGD

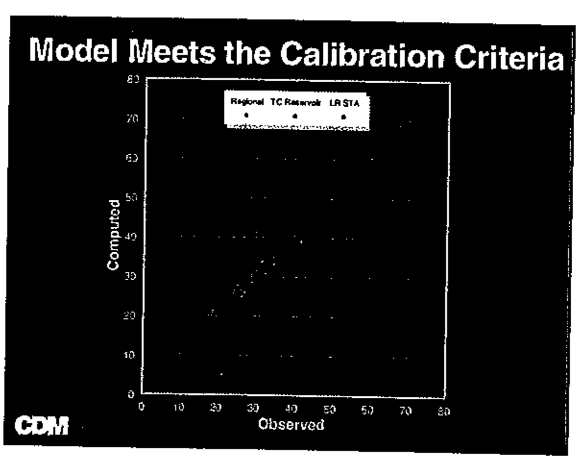
CDM

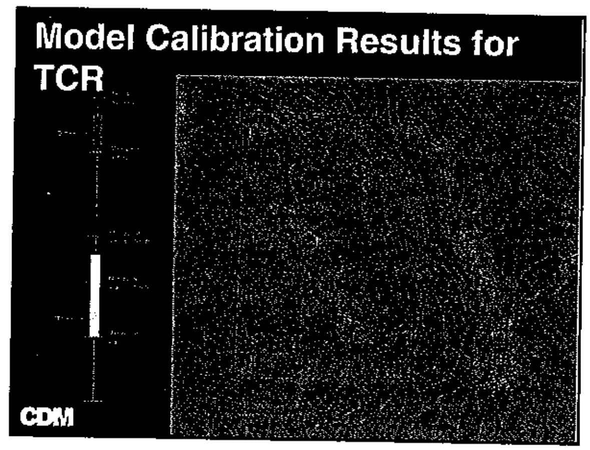

Topography
CDM


Generalized Hydrogeology Input Data
CDM


Groundwater Flow Model
Model Domain:
36 by 40 miles
Model Layer:
6 Layers
Model Cell Size:
528 by 528 ft
Model Boundary Conditions
CDM

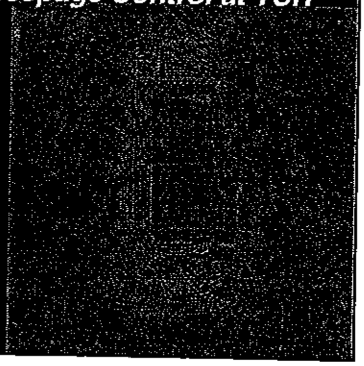

Model Calibration Results
(42 Offsite MW)
CDM


Model Meets the Calibration Criteria
Regional
TC Reservoir
LR STA
Computed
Observed
0
10
20
30
40
50
60
70
80
CDM


Model Calibration Results for TCR
CDM

Current Results: *Post-Conditions (ALT 2B) No Seepage Control at TCR*

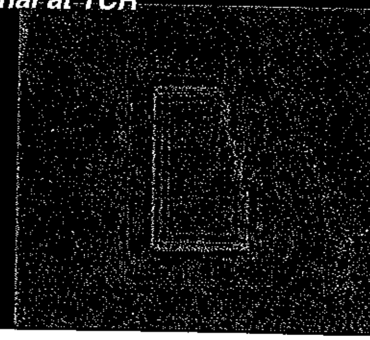
- Water level in Reservoir: 49 ft (NGVD)



CDM

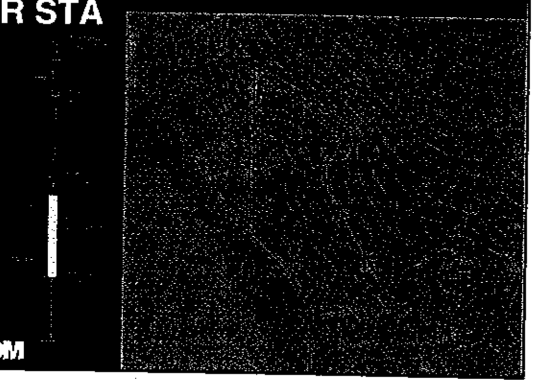
Current Results: *Post-Conditions Internal Drain in Embankment with Seepage Canal at TCR*

- Internal drain: 31 ft (NGVD)
- Seepage canal: 24 ft (NGVD)



CDM

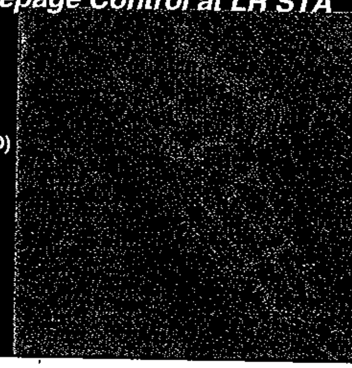
Model Calibration Results for LR STA



CDM

Current Results: *Post-Conditions (ALT 4) No Seepage Control at LR STA*

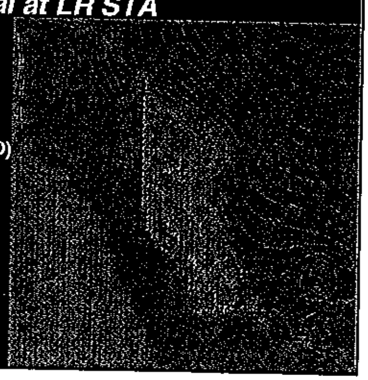
- Water level in STA: 17.5 – 26.5 ft (NGVD)



CDM

Current Results: *Post-Conditions Seepage Canal at LR STA*

- Water level in STA: 17.5 – 26.5 ft (NGVD)
- Seepage canal: 12 & 14 ft (NGVD)



CDM

Summary of Results

- Seepage
  - Important factor at both sites
  - Test Cell – to confirm modeling results
  - Seepage control critical at both sites
- Offsite impacts
  - Seepage control highly critical at TCR
- Recharge / Baseflow
  - Model calibration confirms low baseflow measured in TC
  - Provided insight to SW and Systems modeling

CDM

Continuing to Evaluate

- Thin or absent confining unit at TCR
- Seepage controls

CDM

Task 5.4 Hydrologic and Hydraulic Models

Tom Nye, Ph.D., P.E.

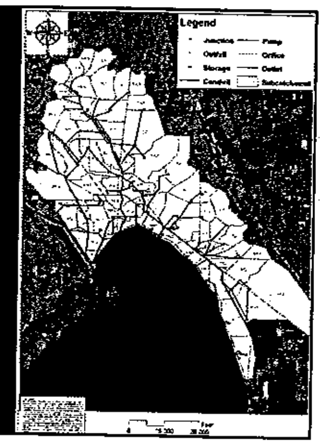
CDM

LOFT Hydrologic and Hydraulic Modeling Objectives

- Evaluate and Size Project Components
- Meet ERP Criteria for No Offsite Impacts
- Coordinate With and Support Parallel Modeling Efforts

CDM

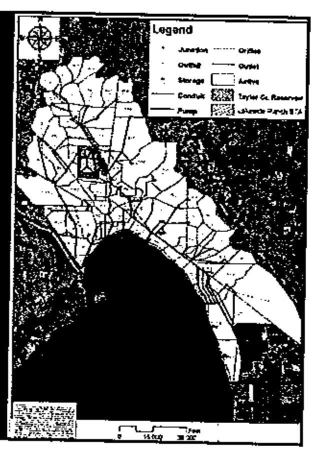
SWMM Schematic



CDM

SWMM Schematic

- Project conditions for design alternatives

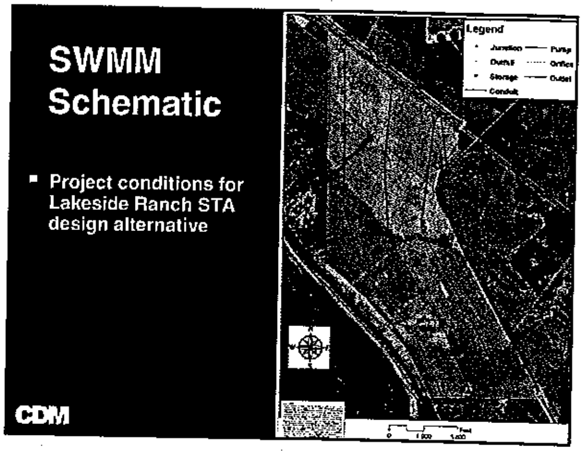


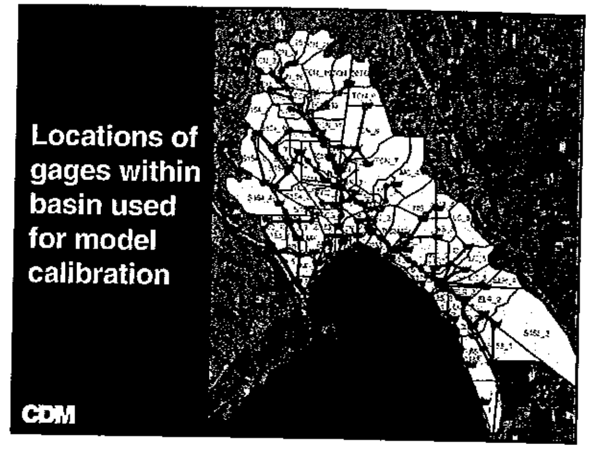
CDM

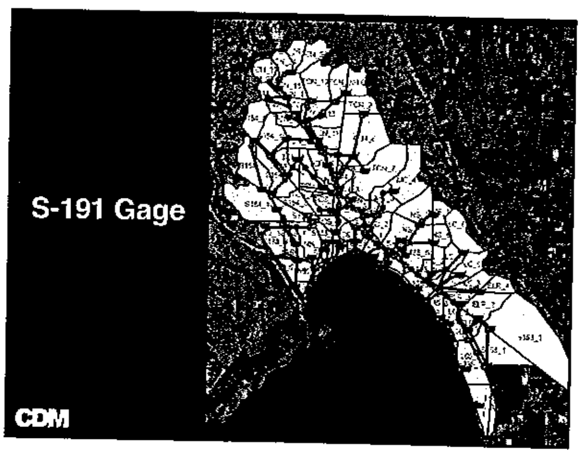
SWMM Schematic

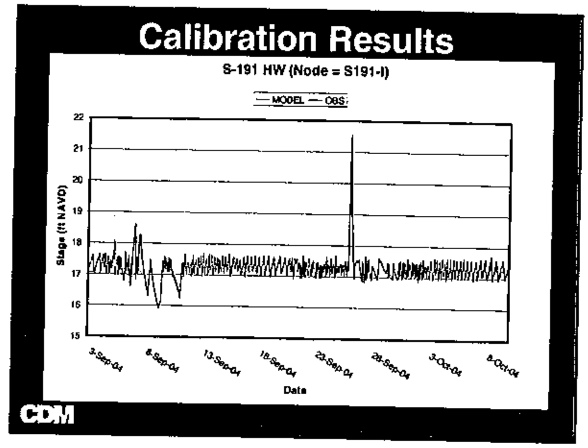
- Project conditions for Taylor Creek Reservoir design alternative

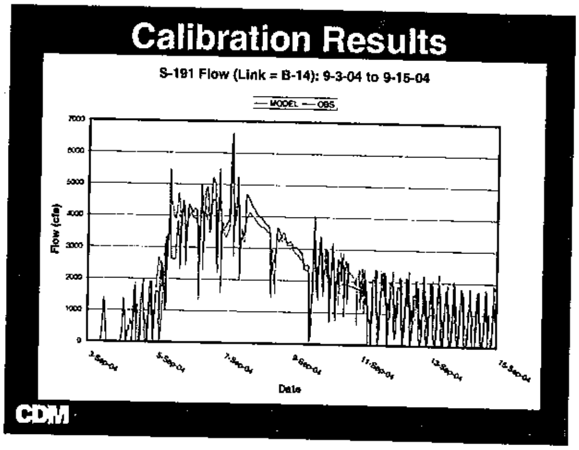
CDM

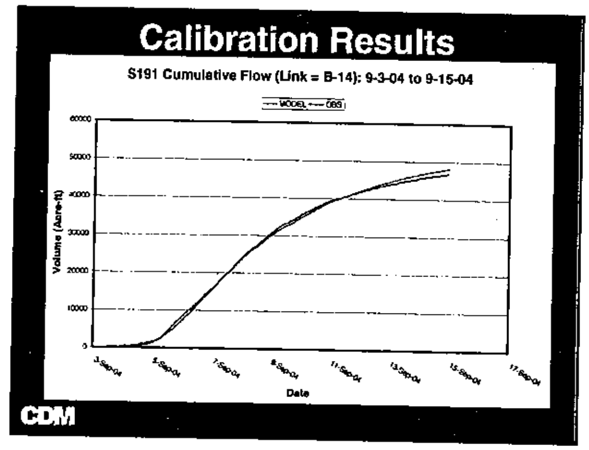

SWMM Schematic
Project conditions for Lakeside Ranch STA design alternative
Legend
CDM

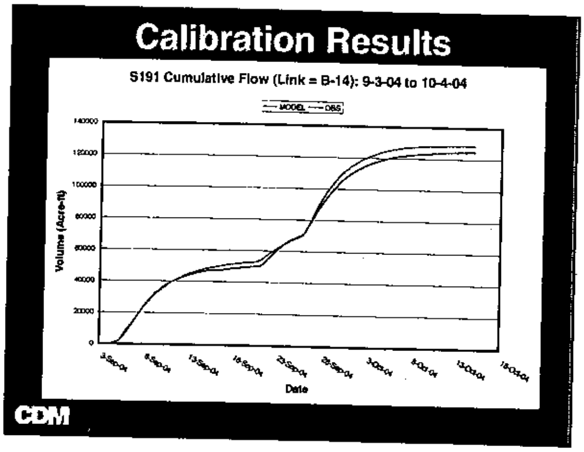

Locations of gages within basin used for model calibration
CDM

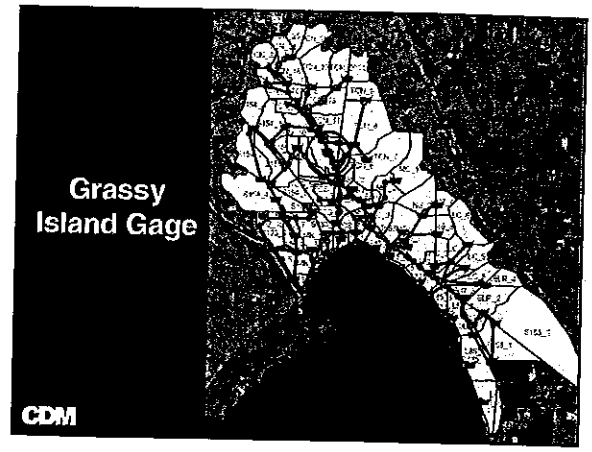

S-191 Gage
CDM

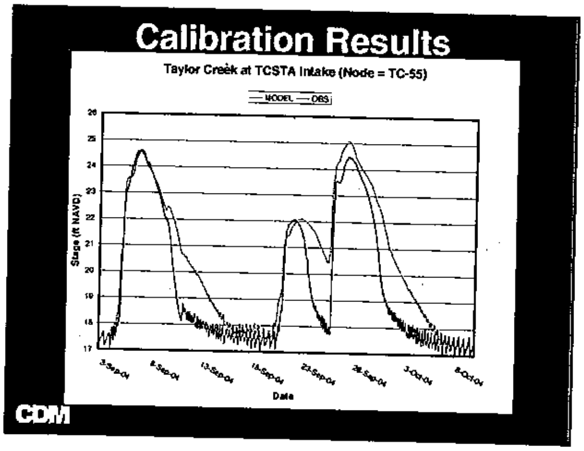

Calibration Results
S-191 HW (Node = S191-I)
MODEL
OBS
Stage (ft NAVD)
22
21
20
19
18
17
16
15
3-Sep-04
8-Sep-04
13-Sep-04
18-Sep-04
23-Sep-04
28-Sep-04
3-Oct-04
8-Oct-04
Date
CDM

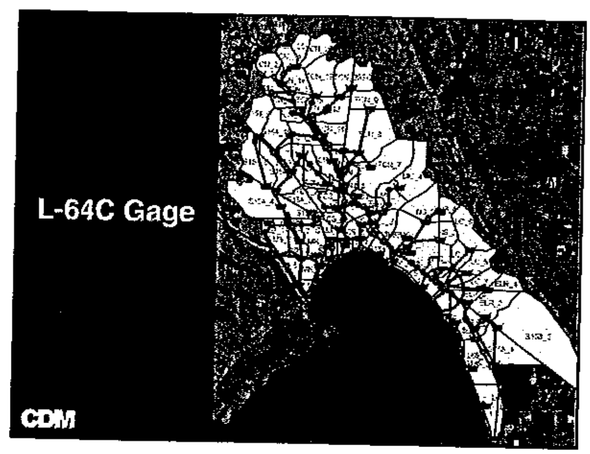

Calibration Results
S-191 Flow (Link = B-14): 9-3-04 to 9-15-04
MODEL
OBS
Flow (cfs)
Date
CDM

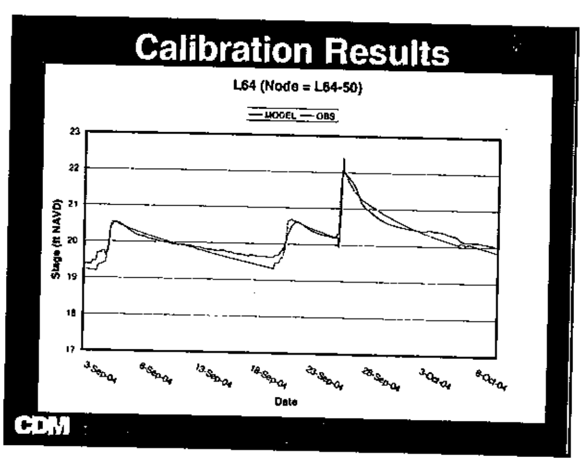

Calibration Results
S191 Cumulative Flow (Link = B-14): 9-3-04 to 9-15-04
MODEL
OBS
Volume (Acre-ft)
Date
CDM

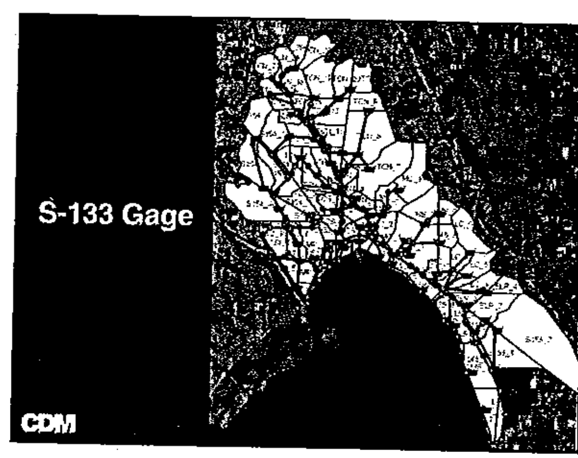

Calibration Results
S191 Cumulative Flow (Link = B-14): 9-3-04 to 10-4-04
MODEL
OBS
Volume (Acre-ft)
Date
CDM

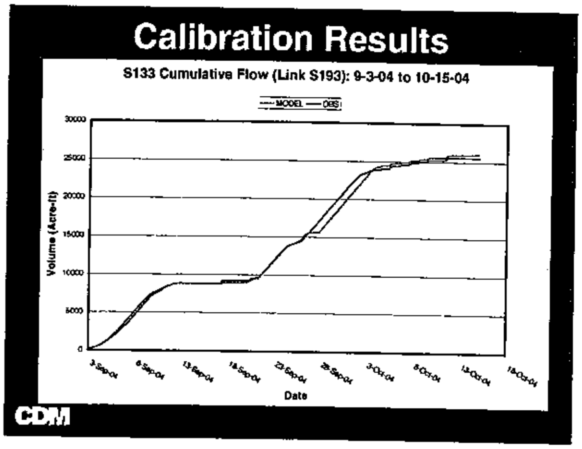

Grassy Island Gage
CDM

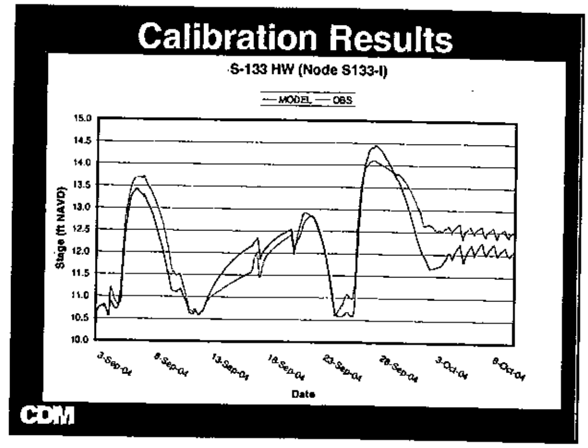

Calibration Results
Taylor Creek at TCSTA Intake (Node = TC-55)
MODEL
OBS
Stage (ft NAVD)
Date
CDM

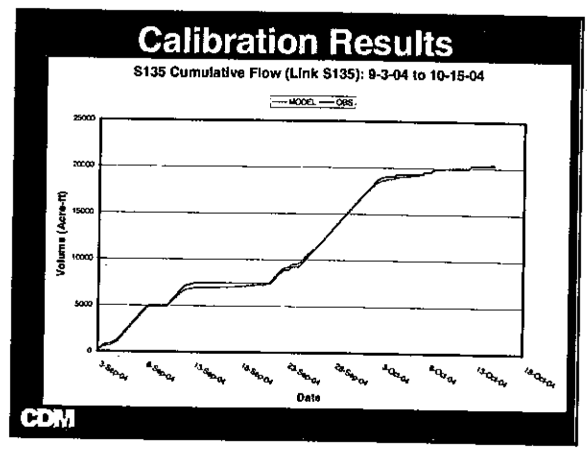

L-64C Gage
CDM

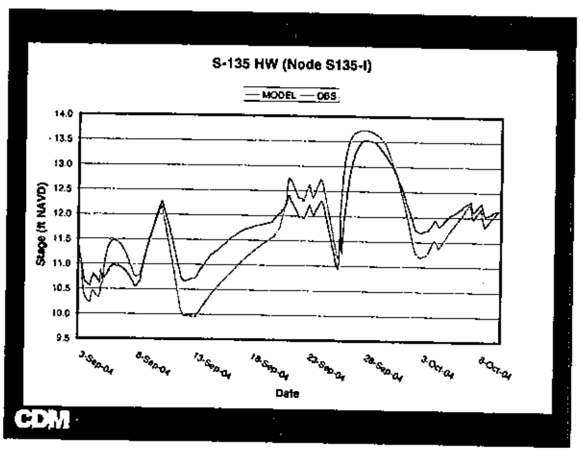

Calibration Results
L64 (Node = L64-50)
MODEL
OBS
Stage (ft NAVD)
Date
CDM


S-133 Gage
CDM









Summary of Results

- Project Components Sized to Capture Flow
- Project Components Meet ERP Criteria of No Offsite Stage increases for all Design Storms (including the 56 inch PMP)

CDM

Task 5.6 STA Design Analyses and O&M Plan

Larry Schwartz, Ph.D., P.W.S.

CDM

LOFT Project Component Evaluation

- Taylor Creek Reservoir
- Taylor Creek STA (Grassy Island)
-
- Nubbin Slough STA North System
  [330 ac STA Expansion]
- Nubbin Slough STA South System
  [Critical STA (809 ac) plus STA Expansion (170 ac)]
- Lakeside Ranch STA
-

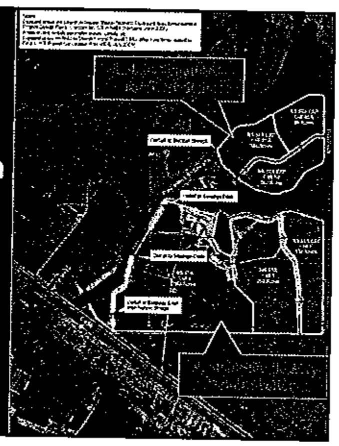
CDM

Taylor Creek STA

- Total STA Site Area: 170 acres
- Effective Treatment Area: 142 acres

CDM

Nubbin Slough STA Systems



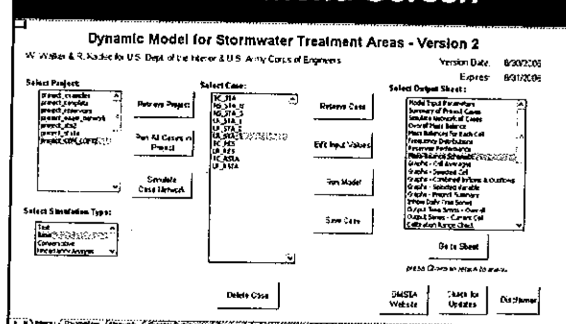
CDM

Task 5.6 STA Design Analysis

- DMSTA2 Cases
  - Taylor Creek STA (Grassy Island)
  - Nubbin Slough STA North System
  - Nubbin Slough STA South System
  - Lakeside Ranch STA
  - Taylor Creek Reservoir

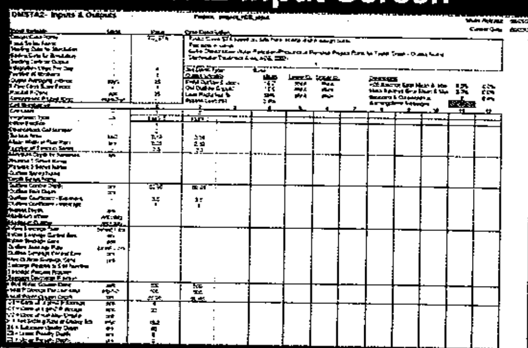
CDM

DMSTA2 Menu Screen



CDM

DMSTA2 Input Screen



CDM

DMSTA / STELLA Coordination

- Time series data – flow & [TP]
- Incorporation of Phosphorus Removal processes into STELLA
  - STA accretion
  - RES sedimentation
  - ATS algal uptake

CDM

Lakeside Ranch STA Configuration

CDM

Lakeside Ranch STA Configuration

- Configuration Issues
  - Seepage
  - Site constraints:
    - Wetlands / Habitat
    - Gas Pipeline
    - Fiber Optic Line
    - Topography
  - L-47
  - ATS
- Other Issues
  - Release of stored P

CDM

Lakeside Ranch STA Preliminary Design Criteria

- STA must include minimum of two flow paths.
- Flow paths must include minimum of two cells in series; minimum of one collection and redistribution channel between cells.
- Cell aspect ratios (L:W) should range from 1:1 to 3:1.
- Site topography, aspect ratio, cut and fill dirt balance, and number of structures are key factors for the overall layout.

CDM

Lakeside Ranch STA Preliminary Design Criteria

- Water depth criteria for each cell:
  - *Average:* 18 inches (at design peak flow)
  - *Minimum:* 6 inches (including drought conditions)
  - *Maximum:* 4 ft (absolute max for design storm conditions; cannot last longer than ~2 weeks)
  - *Long-Term Maximum:* 24 inches (to be determined)
- Approximately 0.5 – 1.0 ft of head loss assumed through cells

CDM

Lakeside Ranch STA Preliminary Design Criteria

- An effort was made to balance two objectives of the cell design:
  - Uniform depth of water throughout each cell which is optimal for vegetation targeted for growth
  - Sloped cells to minimize earthwork volumes and cost and to allow for head loss across the cell

CDM

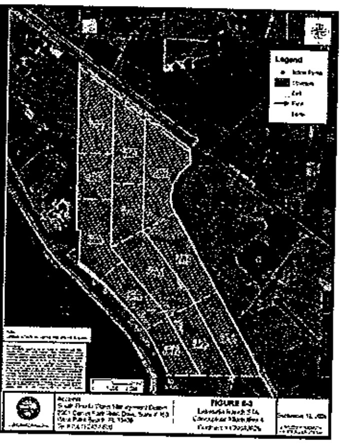
Lakeside Ranch STA Preliminary Design Criteria

- Within each cell, water collects in a submerged channel, flows through a structure in the separation levee and then into a submerged redistribution channel.
- Structure size and location will be determined such that head loss through the system is dominated by the vegetation head loss component.
- The STA cells will be designed to accommodate an Operations Scenario by which the daily loading of water is pumped to the STA over a period of 24 hours.
  - The system will be checked to see the impact of an operational period of 8 hours, which represents a peaking factor of 3 applied to the design flow.

CDM

Lakeside Ranch STA Configuration

- Hydraulic Loading Rate: 6.3 in/week (based on Q = 90 cfs)



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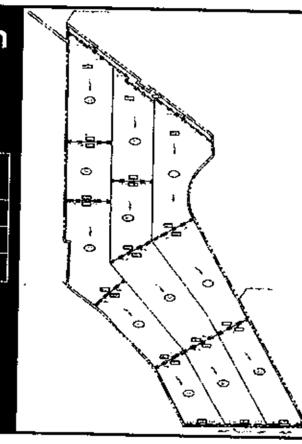
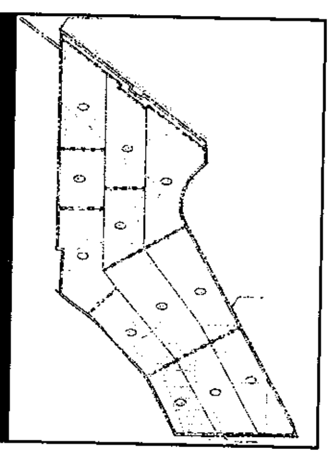
Lakeside Ranch STA Layout

Flow Path	Elevation Drop (ft NAVD)
A	25.1 - 14.7
B	25.1 - 18.4
C	24.7 - 21.8



CDM

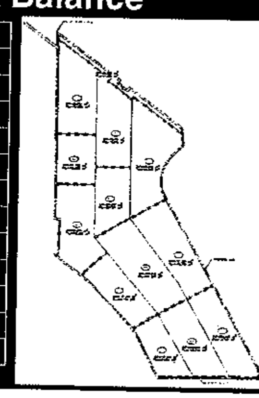
Existing Site Topography



CDM

Earthwork Balance

Cell	Cut (CY)	Fill (CY)
A-1	39,000	122,000
A-2	172,000	153,000
A-3	89,000	390,000
A-4	137,000	96,000
A-5	147,000	37,000
B-1	76,000	71,000
B-2	229,000	238,000
B-3	385,000	418,000
B-4	400,000	123,000
C-1	189,000	144,000
C-2	127,000	163,000
C-3	252,000	13,000



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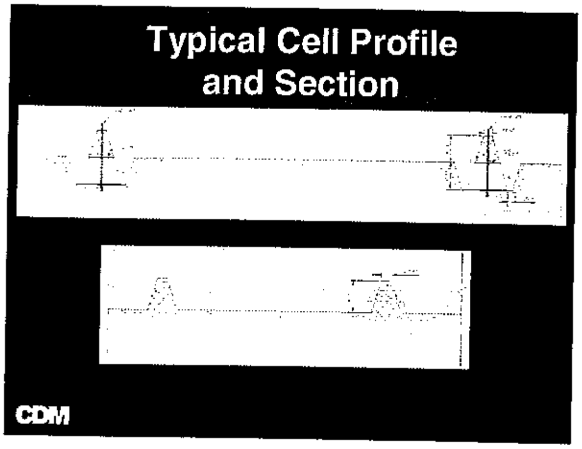
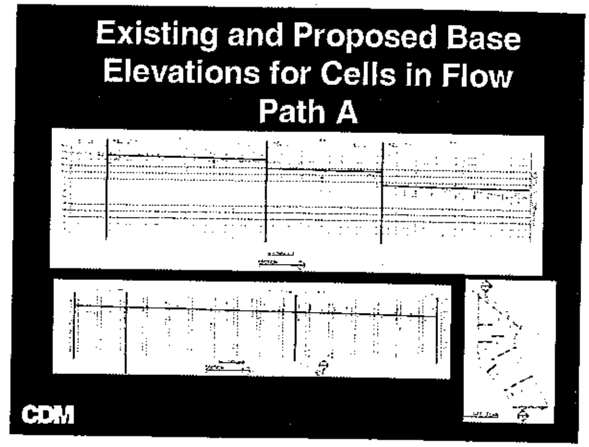
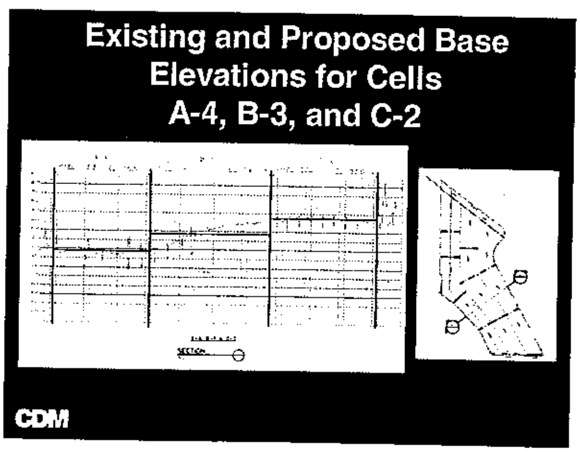
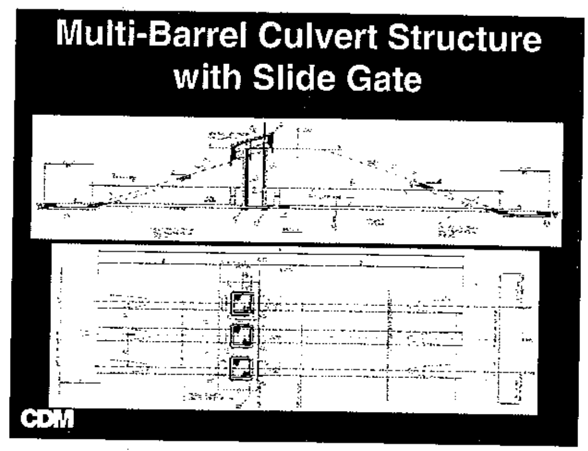
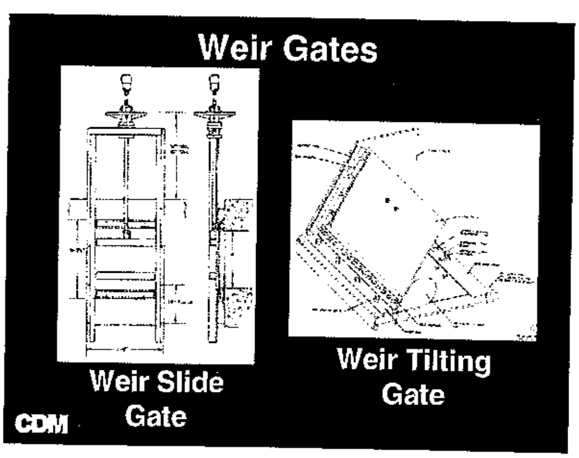
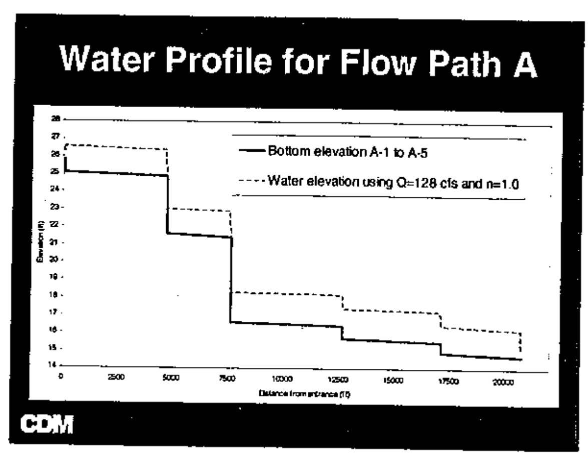

Typical Cell Profile and Section
CDM


Existing and Proposed Base Elevations for Cells in Flow Path A
CDM

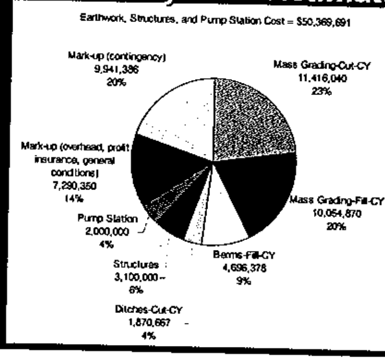

Existing and Proposed Base Elevations for Cells A-4, B-3, and C-2
CDM


Multi-Barrel Culvert Structure with Slide Gate
CDM


Weir Gates
Weir Slide Gate
Weir Tilting Gate
CDM


Water Profile for Flow Path A
Bottom elevation A-1 to A-5
Water elevation using Q=128 cfs and n=1.0
0
2500
5000
7500
10000
12500
15000
17500
20000
CDM

Lakeside Ranch STA Preliminary Cost Estimate



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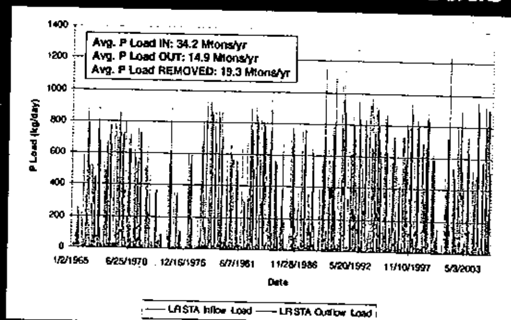
Preliminary DMSTA2 Results

	Lakeside Ranch STA	Taylor Creek Reservoir	Taylor Creek STA	Nubbin Slough North STA	Nubbin Slough South STA
Hydraulic Residence Time (days)	21.4	271.6	11.5	8.5	20.8
P Load Removed (Mtons/yr)	19.3	6.5	1.4	2.7	6.2
P Load Removal Efficiency (%)	57%	30%	35%	26%	66%

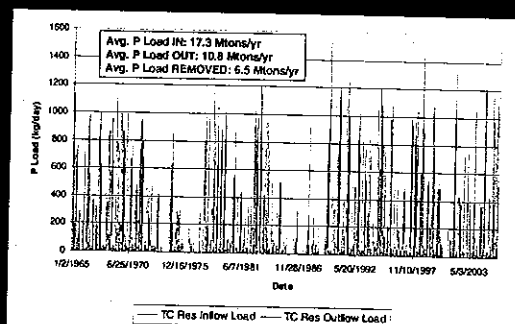
CDM

Lakeside Ranch STA P Loads



CDM

Taylor Creek Reservoir P Loads



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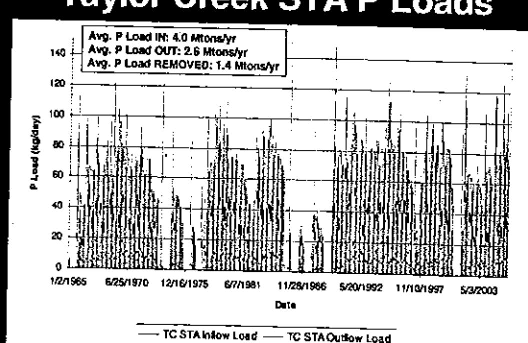
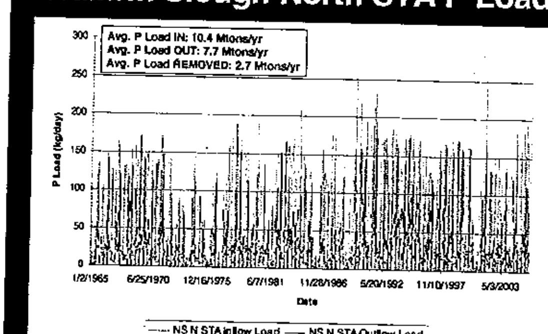
Taylor Creek STA P Loads



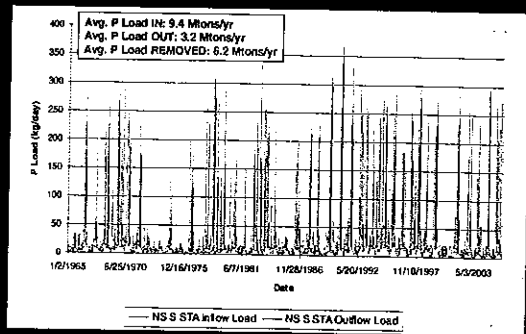
CDM

Nubbin Slough North STA P Loads



CDM

Nubbin Slough South STA P Loads



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Task 5.8 Watershed, Systems, and Operations Model and Evaluations

Kirk S. Westphal, P.E.

CDM

Overview

- Purpose and Goals
- Model Structure & Schematic
- Routing of water and phosphorus
- Approximation of DMSTA2 routines
- Model Tests
- Preliminary Results

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Goals of Operations Modeling

- Assimilate results of other models in a comprehensive system model, covering 1965-2005 with daily values
- Measure key performance indicators:
  - Water capture
  - Phosphorus removal
  - Residence times
- Test alternative system configurations
  - Flow pathways
  - Storage footprints / depths
  - Hydraulic capacities (pumps and outlets)
- Test alternative operating rules & triggers
- Develop "Tuned" system configuration for final evaluation with DMSTA2

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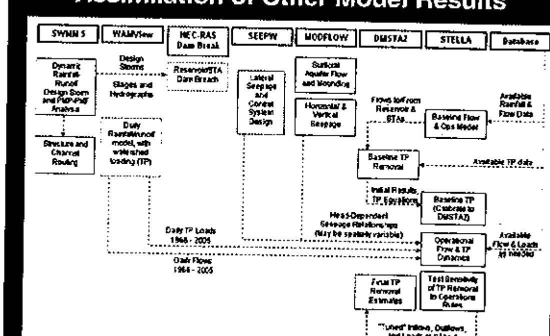
Assimilation of Other Model Results



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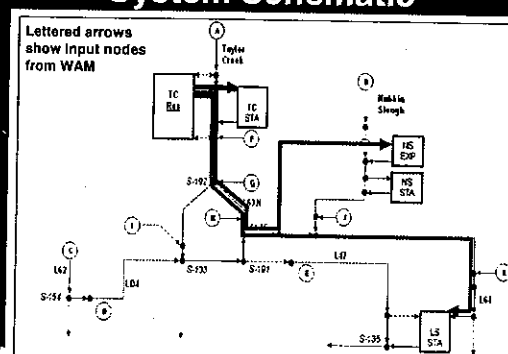
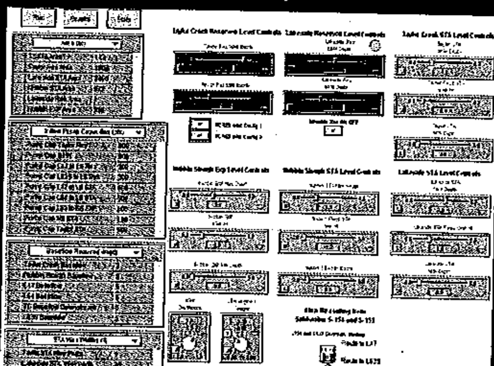
System Schematic



Model Structure – Input Variables



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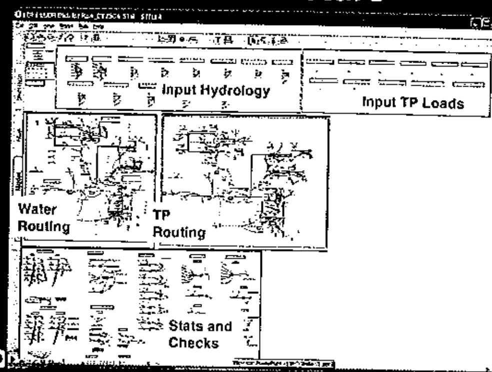
Model Structure



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Basic Flow Logic

RESERVOIR

- Water pumped into reservoir if < maximum depth.
- Water released from reservoir when any STA water level reaches specified trigger (e.g. 30% of storage above weir)
- No outflows allowed if water is below minimum specified level.

STAs

- Water pumped into STAs if < maximum depth.
- Water released from STAs according to weir equations
  - Gates are partially closed (weir raised) when no flow is going *into* an STA
- Model constrained to leave specified baseflow in streams/canals

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Approximating DMSTA2 Phosphorus Dynamics

- Provide means of quickly determining sensitivity of phosphorus removal rates to:
  - Element capacities
  - Operating rules & triggers
  - Alternative flow pathways
- Tune system for effective water capture and phosphorus removal rates
- Avoid burdening DMSTA with operational complexities – handle those in STELLA and pass resulting inflows to DMSTA

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Simplified Mathematics of Phosphorus Decay

- Assume first-order decay
- Include depth correction and concentration correction factors per DMSTA
- Simplify from multi-tank to single tank using linear multiplier (approximation)

$$TP_{out} = Conc_{Inf} K(Area)(F_v)(F_c) Conv_{[illegible]} Conv_{[illegible]}$$

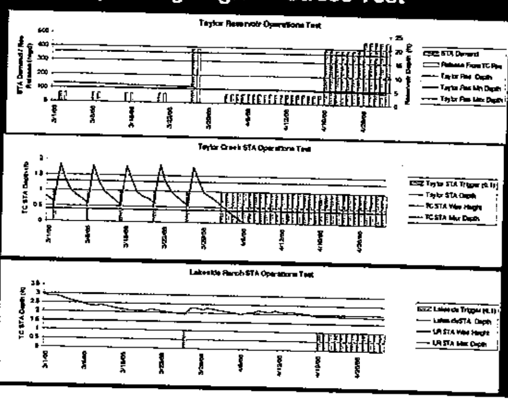
- Per DMSTA: K = 16.8m/yr for STA, 3.2 m/yr for Reservoir

CDM

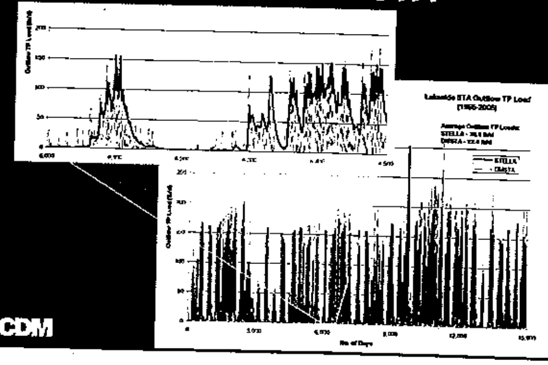
Model Tests

- Water and TP Mass Balance
- STA Hydraulics
- Operating Logic
- STELLA & DMSTA Comparison

Operating Logic – "Stress Test"



STELLA & DMSTA TP Outflow from Lakeside STA



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Preliminary Results

Preliminary Configuration

- Surface Areas:
  - Reservoir: 1,600 acres
  - Taylor Creek STA: 142 acres
  - Nubbin Slough Critical STA: 979 acres
  - Nubbin Slough Expansion: 330 acres
  - Lakeside Ranch STA: 2,400 acres
- Reservoir operating range: 4' min, 15' max
- STA operating range: ~0.5' min, ~1.5' – 2' max
- Pump capacities: 100 – 500 cfs
- Reservoir releases triggered when STAs go below 10% of storage above weir
- Rerouted flows from S-154 and S-133 directed to L63S
- Reservoir intake at northeast corner

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STELLA Baseline Configuration

- Analyzed baseline case and performed sensitivity analyses varying seepage, effects of outflow from Lake Okeechobee, pump sizes, maximum depths, reservoir inflow pump locations, etc...

Baseline Configuration & Range of Sensitivity Analyses:

Variable Category	Variable	Baseline Value	Range for Sensitivity Analysis
	Taylor Creek Reservoir		
Geometry	Reservoir Area (acres)	1,600	0-3,200
	Max Reservoir Depth (feet)	15	12-18
	Min Reservoir Depth (feet)	4	3-5
Hydraulic Capacity	Inflow Pump Capacity (cfs)	500	0-1,000
	Release Outflow Capacity (cfs)	500	0-1,000
	Lakeside STA		
Geometry	STA Area (acres)	2,400	-
	Max STA Depth (feet)	3	3-4
	Min STA Depth (feet)	0.5	-
	Weir Height (feet)	0.75	0-1.5
	Weir Width (feet)	24	20-35
	Weir Coefficient	3	-
Hydraulic Capacity	Inflow Pump Capacity (cfs)	500	0-1,000
Other	Augmentation Capacity (%)	10	10-30

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STELLA Sensitivity Runs

- Preliminary results indicate value of a smaller Taylor Creek Reservoir footprint (1,600 ac) with depths between 4-15 ft
- Sensitivity runs performed to date have used a Northeast inflow pump location for the Taylor Creek Reservoir
- Performed four main runs to determine effect of seepage controls and potential outflow from Lake Okeechobee

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Description of STELLA Sensitivity Runs

- Simulation 0—Locks closed; Seepage Control at Taylor Creek Reservoir only
- Simulation 1—Locks closed; No Seepage Controls at Taylor Creek Reservoir and Lakeside STA
- Simulation 2—Locks closed; Seepage Controls at Taylor Creek Reservoir and Lakeside STA
- Simulation 3—Locks open; Seepage Controls at Taylor Creek Reservoir only; Assumed Lake Okeechobee concentration of 60 ppb
- Simulation 4—Locks closed; No Seepage Controls at Taylor Creek Reservoir and Lakeside STA, Reduced seepage estimates

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STELLA Preliminary Results

	Simulation No.				
	Baseline (0) [1]	(1) [2]	(2) [3]	(3) [4]	(4) [5]
TP Load Removal Efficiency, %					
Taylor Creek Reservoir	24.8	23.4	24.9	24.9	17.9
Lakeside Ranch STA	59.1	58.8	59.4	59.3	58.5
TP Load Removed, mton/yr					
Taylor Creek Reservoir	4.4	4.4	4.3	4.4	3.2
Lakeside Ranch STA	20.8	21.2	20.0	20.8	21.2
Hydraulic Residence Time, days					
Taylor Creek Reservoir	280.7	197.6	296.8	281.3	205.8
Lakeside Ranch STA	20.9	20.6	22.3	21.2	20.2

- TP load removal efficiency varies between 18-25% at Taylor Creek Reservoir and remains stable at 59% for Lakeside STA
- TP load removed varies between 3-4 mton/yr at Taylor Creek Reservoir and between 20-21 mton/yr for Lakeside STA
- Residence time varies between 200-300 days at Taylor Creek Reservoir and between 20-22 days at Lakeside STA

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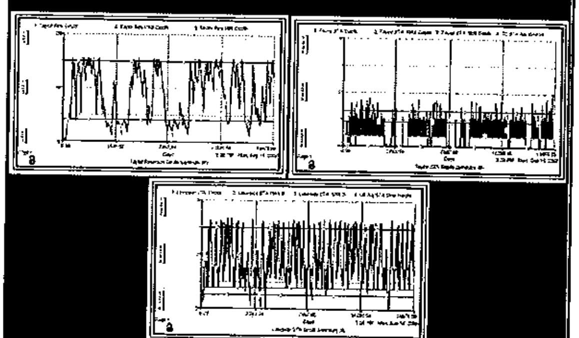
Simulation 5: Depth plots with Current Seepage



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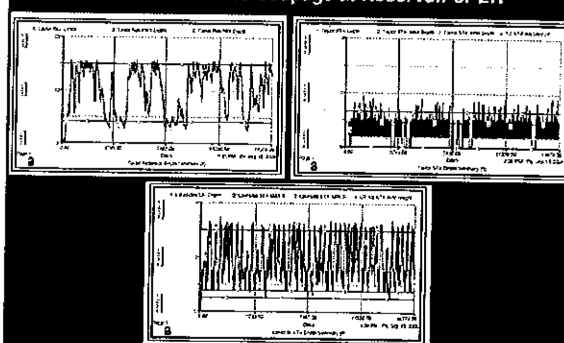
Simulation 2: No Seepage at Reservoir or LR



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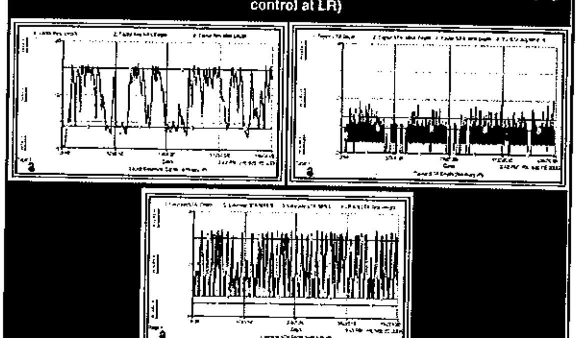
Simulation 3: Locks Open & No Seepage at Taylor Creek Reservoir (No seepage control at LR)



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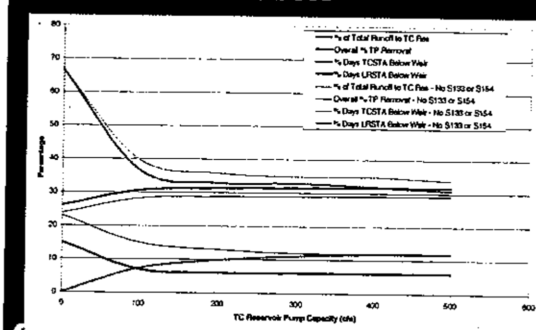
With outflow from Lake Okeechobee & Seepage Control at Taylor Creek Reservoir, only Taylor Creek STA still runs dry

Taylor Creek Reservoir Sensitivity Tests



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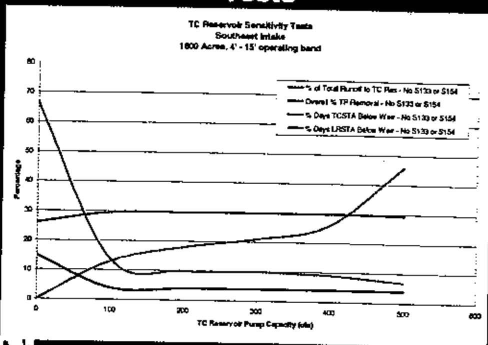
Taylor Creek Reservoir Sensitivity Tests



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Preliminary Operational Findings

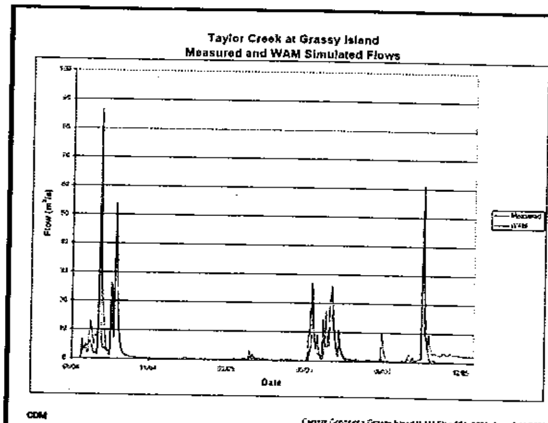
- To maximize TP treatment, treatment components must be constantly wetted
- Seepage controls at Taylor Creek Reservoir are necessary to maintain permanent pool volume
- Taylor Creek STA runs dry under all scenarios with a northeast intake, seepage recirculation and southeast intake may improve this condition
- To maintain Lakeside STA constantly hydrated, need seepage controls or pump from Lake Okeechobee during low-flow conditions
- Pump at reservoir does not need to be larger than 500 cfs.

CDM

Basin WAM Simulated Flows and Loads Summary Table

Basin	Area (acres)	% Difference In Flow	SFWMD TP Load (tm/yr)	WAM TP Load (mtons/yr)	% Difference in Load
S-191	119,809	5%	86	89	3%
S-154	31,629	9%	26	24	-11%
S-135	18,008	-3%	4	14	258%
S-133	25,530	8%	8	10	21%

CDM



CDM

Dam and Reservoir Design

Steve Whiteside, P.E.

Thomas W. Nichols, P.E.

CDM

Taylor Creek Reservoir and Lakeside Ranch STA Geotechnical and Hydrogeological Field Investigations

- Site Accessibility
- Survey
- Piezocone Soundings
- Exploratory Soil Borings
  - Standard Penetration Test Borings
  - Rotosonic Borings
- Probing Depressional Areas
- Geophysical Surveys

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Taylor Creek Reservoir and Lakeside Ranch STA Geotechnical and Hydrogeological Field Investigations

- Test Pits
- Piezometers
- Slug Tests
- Staff Gauges
- Aquifer Performance Tests
- Miscellaneous Field Services

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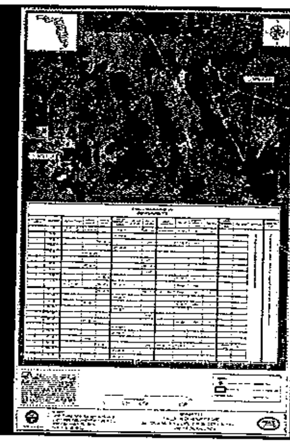

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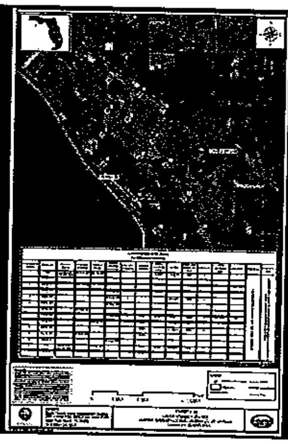

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Table 4-1
Taylor Creek Reservoir Site
Quantity of Laboratory Tests Conducted

Type of Test	Quantity
Carbonate Content	7
Grain Size Analysis	91
Fines Content	157
Hydrometer Analysis	7
Atterberg Limits	69
Moisture Content	327
In-Situ Density	29
Organic Content	13
Triaxial	13
Hydraulic Conductivity - Rigid Wall	2
Hydraulic Conductivity - Flexible Wall	27
One Dimensional Consolidation	9
Modified Proctor	7
Soil Cement	1

CDM

Table 4-1
Lakeside Ranch STA Site
Quantity of Laboratory Tests Conducted

Type of Test	Quantity
Grain Size Analysis	40
Fines Content	72
Hydrometer Analysis	3
Atterberg Limits	17
Moisture Content	151
In-Situ Density	16
Organic Content	14
Hydraulic Conductivity - Rigid Wall	2
Hydraulic Conductivity - Flexible Wall	13
One Dimensional Consolidation	1

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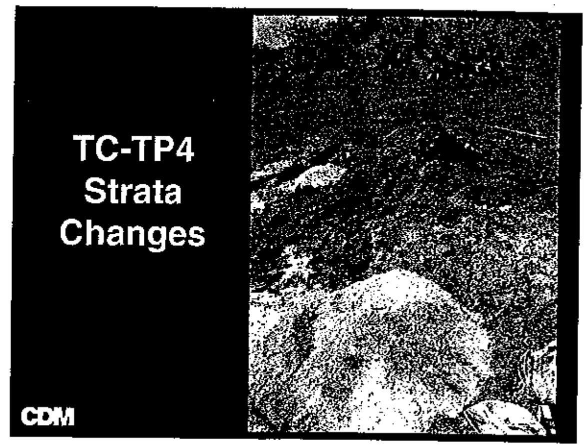
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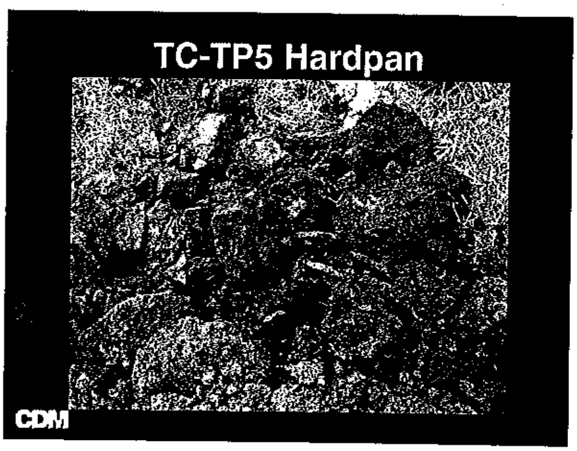
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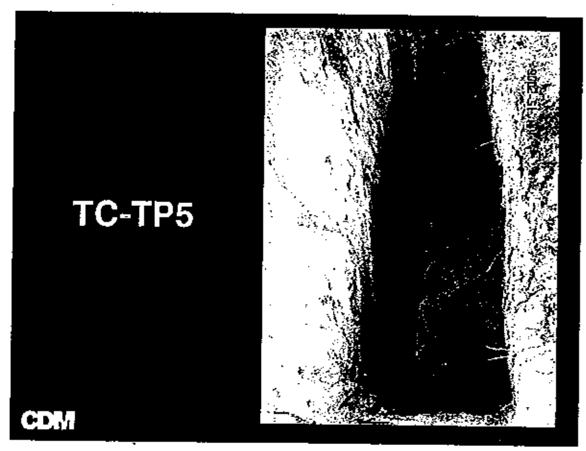
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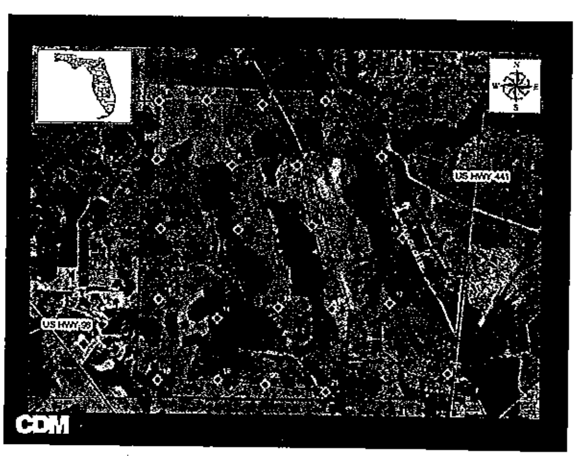
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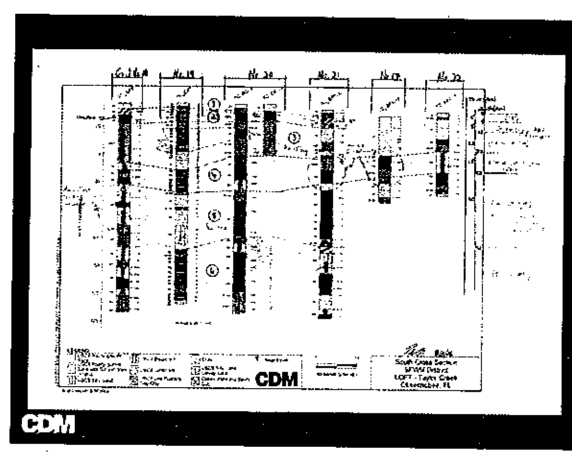
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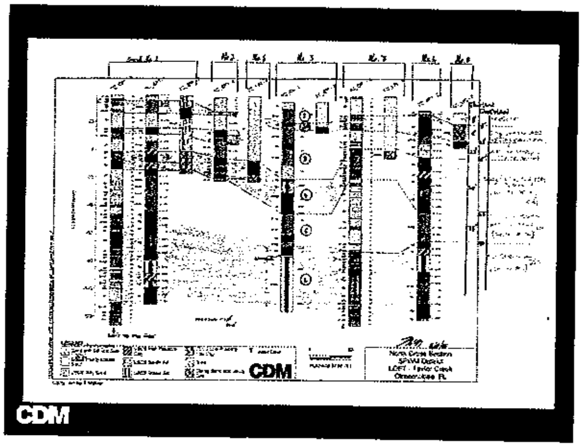
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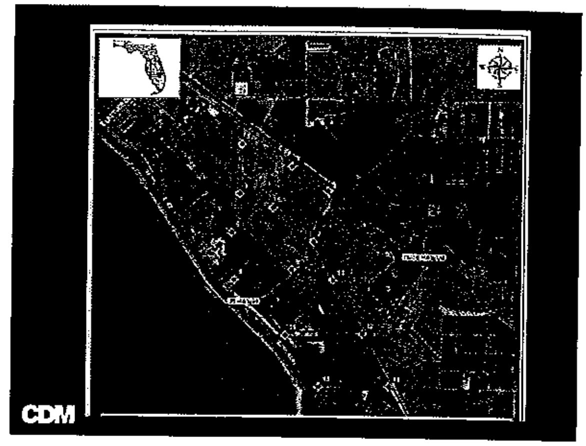
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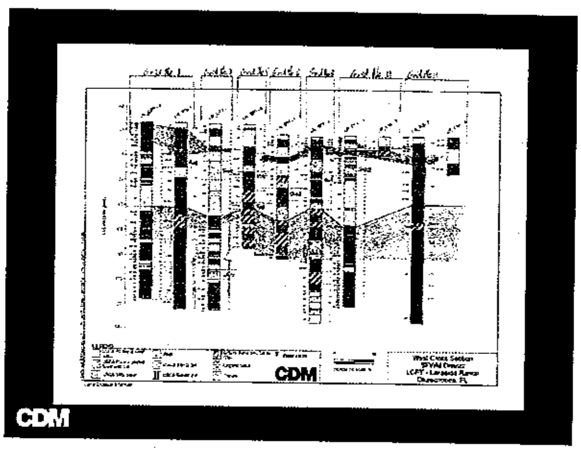
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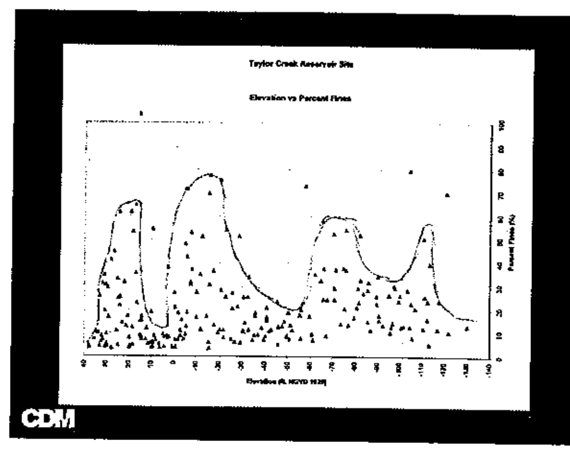
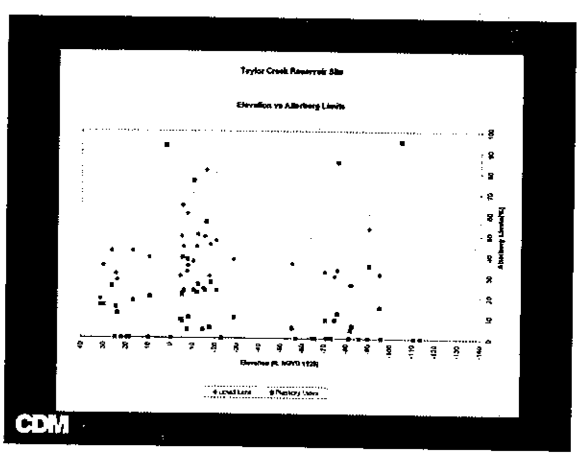

Taylor Creek Reservoir Site
Elevation vs Percent Fines
CDM


Taylor Creek Reservoir Site
Elevation vs Atterberg Limits
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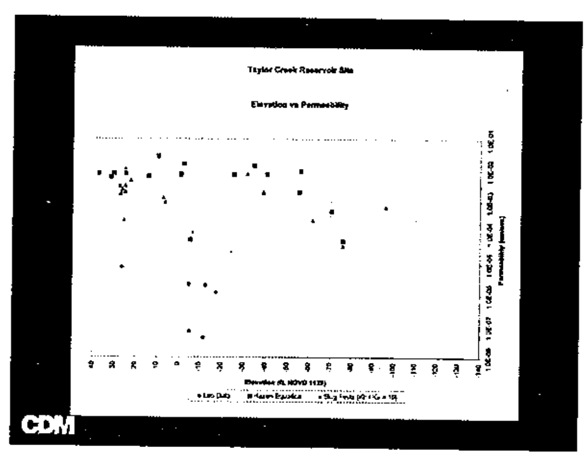
Taylor Creek Reservoir Site
Elevation vs Permeability
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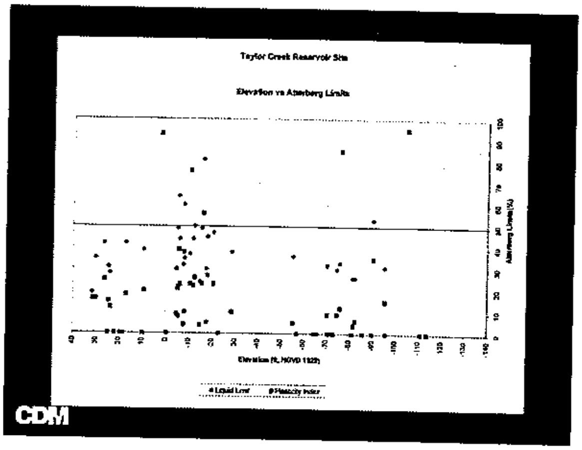
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Elevation vs Atterberg Limits
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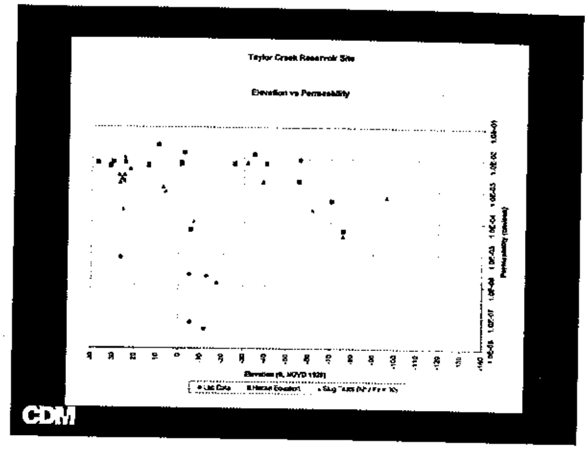
Taylor Creek Reservoir Site
Elevation vs Permeability
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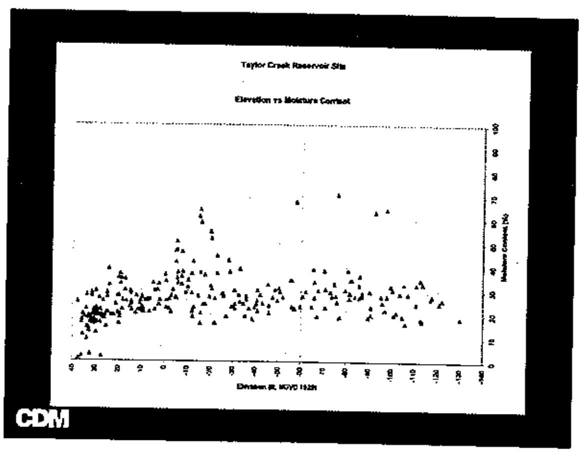
Taylor Creek Reservoir Site
Elevation vs Moisture Content
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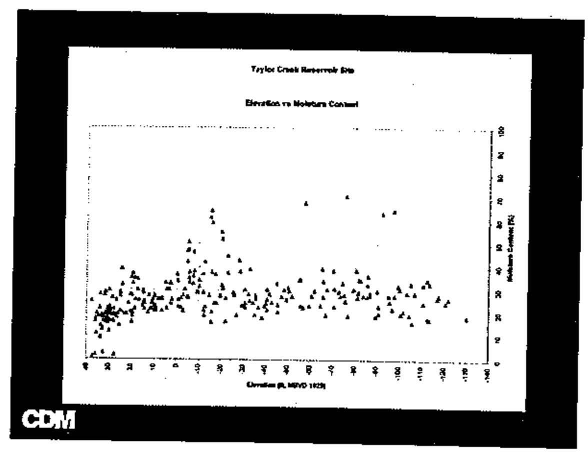
Taylor Creek Reservoir Site
Elevation vs Moisture Content
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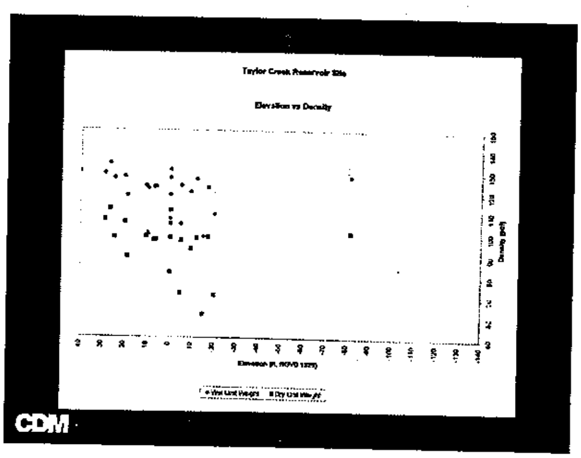
Taylor Creek Reservoir Site
Elevation vs Density
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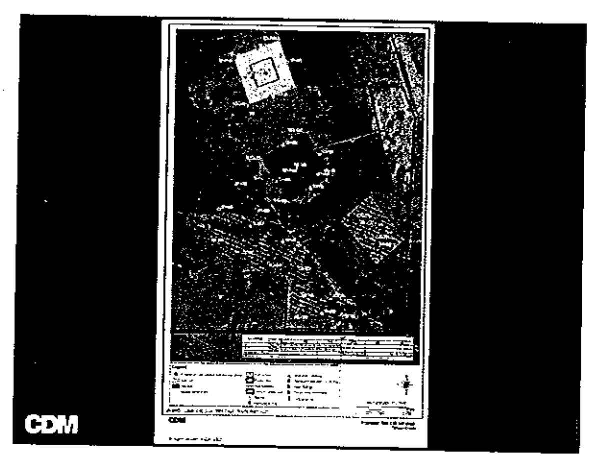
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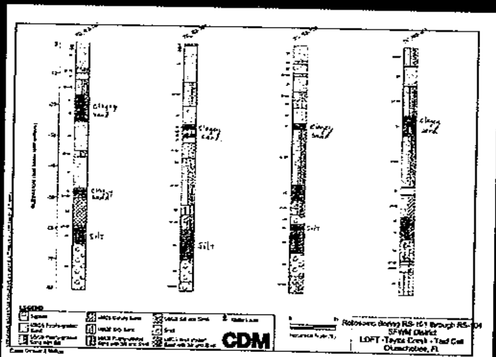

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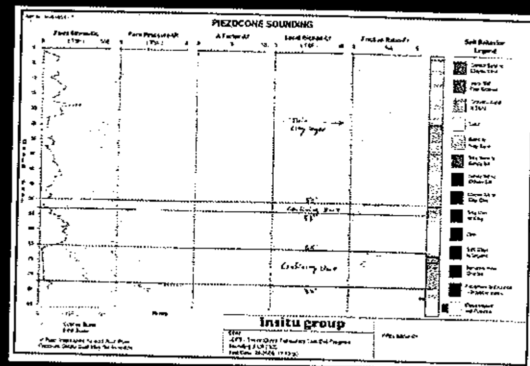

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Conceptual Design Scope

- Wave run-up analyses and erosion protection
- Impoundment seepage control system analysis
- Geotechnical analysis of seepage collection canals
- Stability analyses for embankments
- Seismic evaluation of embankments
- Geotechnical analyses for structure foundations

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Proposed Embankment Cross Sections

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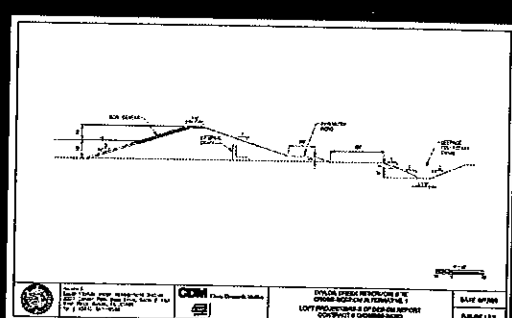
Alternative 1



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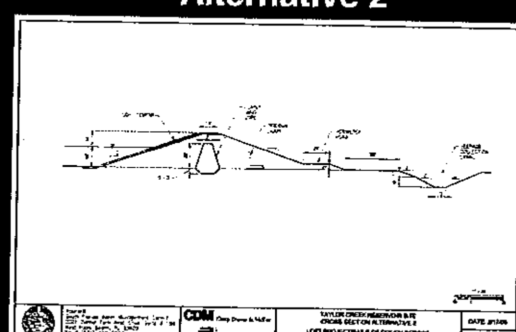
Alternative 2



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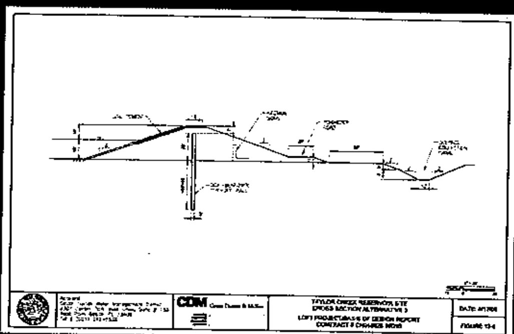
Alternative 3



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Wave Run-up Analyses and Erosion Protection

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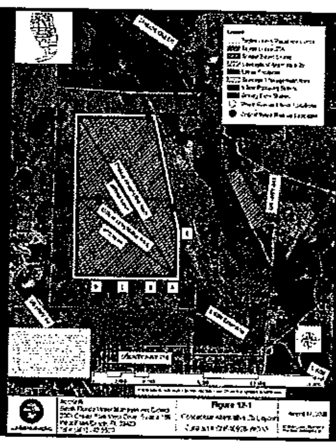

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Design Freeboard

- Design Freeboard is the sum of the following:
  - Design Flood Precipitation Depth (Routed)
  - Wind Set-up
  - Wave Run-up
- Analysis should take into account routed design flood event (total design flood event used for DRAFT analyses)

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Embankment/Berm Geometry

- Embankment Height of 32 feet with operating depth of 18 feet at normal pool
- Crest Width of 16 feet
- Upstream/Downstream Slopes of 3H:1V
- Erosion Protection on Upstream Slope of Stepped Soil-Cement, Riprap, or Articulated Concrete Blocks

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Design Cases

- Case 1:

  Normal Pool level plus precipitation depth for the Probable Maximum Precipitation (PMP) event and a 100-year wind speed.
- Case 2:

  Normal Pool level plus precipitation depth for the 100-year precipitation event and a Category 5 hurricane wind speed
- Case 3:

  Normal Pool level with the probable maximum wind speed (assumed 200 mph)
- Case 4:

  Normal Pool level plus a storm-specific (historical) event.

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Summary of Wave Run-up Analysis for Taylor Creek Reservoir

	Case	Required Freeboard (ft)					
		w/ W-E Internal Berm			w/o W-E Internal Berm		
		Stepped Soil-Cement	Riprap	Articulated Blocks	Stepped Soil-Cement	Riprap	Articulated Blocks
1	PMP + 100 year wind	11.7	10.8	12.2	13.4	12.2	13.9
2	100 year rain + Cat 5	11.5	10.2	12.1	13.5	12.0	14.2
3	Normal Pool + PMW	14.0	12.3	14.8	16.5	14.6	17.4

Notes:
- A reservoir water depth of 18 feet was assumed in analysis.
- The required embankment and freeboard are based on zero over-splash

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Summary

- Draft analyses indicate assumed freeboard of 14 feet adequate for Case 1 and Case 2. Freeboard will be set based upon FINAL analyses for all design cases using STWAVE and ACES programs.
- Considerations that need to be addressed for Final analyses:
  - Final reservoir configuration and normal pool depth
  - Hazard Potential Classification
  - Decision on interior berm
  - Size of spillway and reservoir routing of design flood events
  - Storm-specific case (Case 4)

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Seepage Analyses

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SEEP/W program

- Input the geometry and properties for existing/proposed conditions
- Input Boundary conditions
  - Upstream
    - no flow, constant head boundary at assumed center of reservoir, water surface at EL 49
  - Downstream
    - no flow, constant head boundary 6 feet below existing grade
    - for cross section A, Taylor Creek at EL 19

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SEEP/W program

- Boundary conditions
  - Seepage Ditch
    - open flow, constant head boundary set at seepage ditch, water surface at EL 24
  - Toe drain
    - open flow, unit flux boundary set around pipe perimeter (Invert at EL 30)
  - Bottom
    - no flow
  - Model run for steady state conditions

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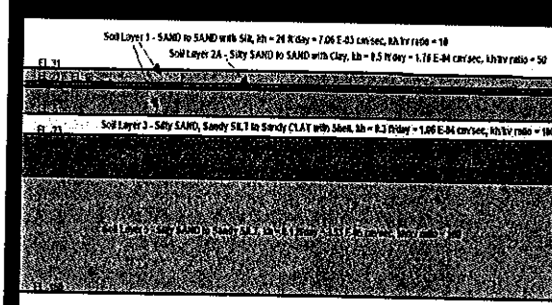
Soil Stratum – Cross Section A



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Parameters for Embankment Materials

Materials	k_h		k_h/k_v	Unit Weight	Effective Friction Angle
	ft/day	cm/sec		(pcf)	ϕ (°)
Sand Drain (assumed import)	28.4	1.0E-02	1.0	120	32
Embankment Fill (assumed on site borrow)	5.7	2.0E-03	4.0	120	34
Embankment Core	0.11	4.0E-05	4.0	120	30
Cutoff Wall	2.8E-04	1.0E-07	1.0	65	0*

Note:
* = Hydrostatic force will be included

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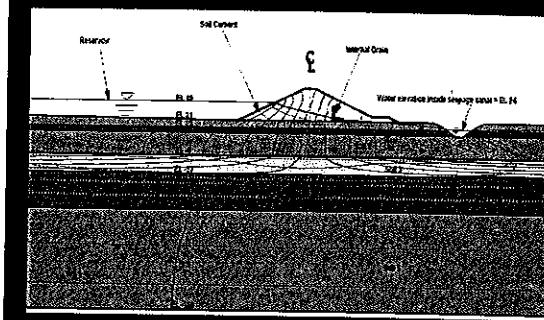
Cross Section A – Alternative 1



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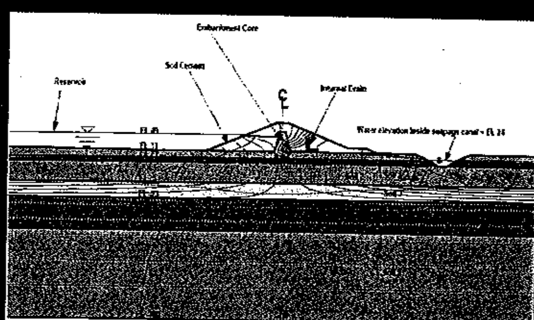
Cross Section A – Alternative 2



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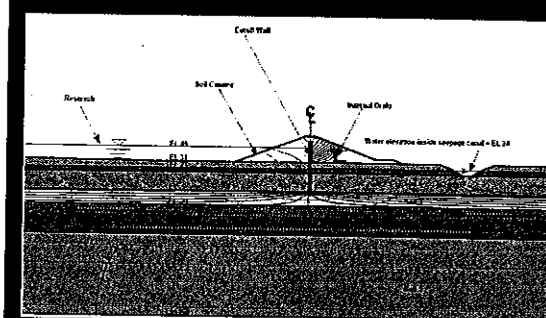
Cross Section A – Alternative 3



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Summary of SEEP/W Results

Case	Total Flow from Reservoir cfs	Flow into Internal Drain cfs	Flow into Seepage Collection Canal cfs	Flow Past Canal cfs	Maximum Gradient in Canal
Alternative 1 – Cross Section A	26.7	12.3	13.0	1.4	0.25
Alternative 2 – Cross Section A	16.7	2.5	12.8	1.4	0.23
Alternative 3 – Cross Section A	3.0	0	1.6	1.6	.01

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Summary of Considerations for Final Seepage Analyses

- Taylor Creek Reservoir
  - Final decision on reservoir normal pool depth
  - Location and depth of seepage collection canal and water depth in canal
  - Seepage control systems
- Lakeside Ranch STA
  - STA configuration
  - STA berm heights
  - STA water depth

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Stability Analyses

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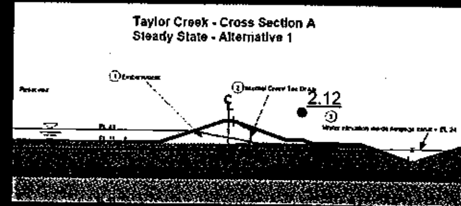
Alternative 1 – Steady-State Seepage at Normal Pool



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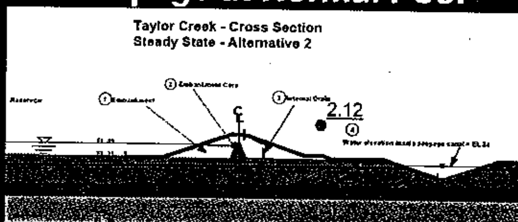
Alternative 2 – Steady-State Seepage at Normal Pool



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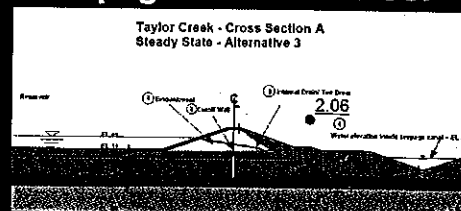
Alternative 3 – Steady-State Seepage at Normal Pool



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Summary of Considerations for Final Stability Analyses

- Final embankment geometry and normal pool depth determined
- Analyses to include all design cases
  - Steady-State Seepage at Maximum Pool
  - During Construction and end of Construction Conditions
  - Sudden Drawdown

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Seismic Evaluation for Embankments TBD

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Geotechnical Analyses for Structure Foundations TBD

CDM

Summary of Geotechnical Analyses for Structure Foundations

- Allowable bearing capacity for foundations
- Estimated foundation settlement under design loads
- Estimated settlement of foundation soils under embankment loads

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Water Control Facilities and Canals

Michael F. Schmidt, P.E., BCEE

Tom Nye, Ph.D., P.E.

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Water Control Components

Name	Description	Location
Taylor Creek Diversion Structure	3 gated box culverts, each 10' W x 14' H	707100 ft east, 1088100 ft north Invert elevation ~ 14.5' NAVD
Taylor Creek Diversion Structure Baseflow Outlet	1 circular pipe 12" dia.	707100 ft east, 1088100 ft north Invert elevation ~ 11.5' NAVD
TCR Inlet Channel	10' wide bottom, 3:1 side slopes, 1' per 1000' bottom slope	4500 ft. long channel from east to west
TCR Inlet Bridge	TBD	Located at 703300 ft east, 1088000 ft north
TCR Pump Station	500 cfs	703000 ft east, 1088100 ft north
TCR Inlet Gate	8' x 8' box culvert with slide gate	Next to TCR Pump Station (703000 ft east, 1088100 ft north), between the intake and eastern seepage canal.

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Water Control Components

Name	Description	Location
TCR Inlet Weir	20' wide rectangular weir	At the pump station intake, between the intake and northern seepage canal Weir crest elevation ~ 24' NAVD
TCR Northern Seepage Canal	15' invert at NW corner sloping west to east to a 7' invert at the pump inlet Depth varies from 19' to 24', 10' wide bottom, 3:1 side slopes	Along northern edge of reservoir from NW corner (697200 ft east, 1088000 ft north) to pump inlet
TCR Western Seepage Canal (North)	20' invert at Wolf Creek (697200 ft east, 1083700 ft north) sloping south to north to a 15' invert at NW corner (697200 ft east, 1088000 ft north) Depth varies from 14' to 19', 10' wide bottom, 3:1 side slopes	Along western edge of reservoir from intersection with Wolf Creek north (697200 ft east, 1083700 ft north) to NW corner (697200 ft east, 1088000 ft north)

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Water Control Components

Name	Description	Location
TCR NW Gate at Wolf Creek	8' x 8' box culvert with slide gate	Just north of the seepage canal intersection with Wolf Creek north (697200 ft east, 1083700 ft north)
TCR Western Seepage Canal (South)	20' inverts, relatively flat, 14' depth, 10' wide bottom, 3:1 side slopes	Along western edge of reservoir from intersection with Wolf Creek north (697200 ft east, 1083700 ft north) to SW corner (697200 ft east, 1075600 ft north)
TCR Southern Seepage Canal	20' inverts, relatively flat, 14' depth, 10' wide bottom, 3:1 side slopes	Along southern edge of reservoir from SW corner (697200 ft east, 1075600 ft north) to the intersection of Wolf Creek south (703900 ft east, 1075700 ft north)

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Water Control Components

Name	Description	Location
TCR SE Gate at Wolf Creek	8' x 8' box culvert with slide gate	Just east of the seepage canal intersection with Wolf Creek south (703900 ft east, 1075700 ft north)
TCR SE Seepage Canal	20' inverts, relatively flat, 14' depth, 10' wide bottom, 3:1 side slopes	Along southeastern edge of reservoir from Wolf Creek SE Gate, around SE corner (705300 ft east, 1075600 ft north) to the TCR Discharge Structure (704900 ft east, 1081400 ft north)
TCR Discharge Structure	2-10' W x 14' H rectangular conduits with slide gates	On the eastern edge of the reservoir in the southern cell (704900 ft east, 1081400 ft north) Invert elevation ~ 40' NAVD

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Water Control Components

Name	Description	Location
TCR Drawdown Structure (External)	2-6' H x 6' W	On the eastern edge of the reservoir in the southern cell (704900 ft east, 1081400 ft north)
TCR Eastern Seepage Canal	20' invert at TCR Discharge Structure sloping south to north to a 17.5' invert at upstream end of the TCR Outlet Canal Depth varies from 14' to 16.5', 10' wide bottom, 3:1 side slopes	Along eastern edge of reservoir from the TCR Inlet Gate (703000 ft east, 1088100 ft north) to the upstream end of the TCR Outlet Canal (704400 ft east, 1083200 ft north)
TCR NE Seepage Canal	18' invert at TCR Inlet Gate sloping north to south to a 17.5' invert at upstream end of the TCR Outlet Canal Depth varies from 13' to 16.5', 10' wide bottom, 3:1 side slopes	Along eastern edge of reservoir from the TCR Discharge Structure (704900 ft east, 1081400 ft north) to the upstream end of the TCR Outlet Canal (704400 ft east, 1083200 ft north)

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Water Control Components

Name	Description	Location
TCR Outlet Canal	4500 ft. long channel, sloping west to east from 17.5' to 11.5' NAVD, 10' wide bottom, 3:1 side slopes, 1' per 1000' bottom slope, depths ranging from 12' to 16.5'	From TCR Discharge Structure (704900 ft east, 1081400 ft north) to Taylor Creek (adjacent to TC STA pump intake, 708700 ft east, 1083400 ft north)
TCR Outlet Weir	20' wide rectangular weir	At the top of the outlet canal, between the eastern seepage channel and the outlet channel Weir crest elevation ~ 24.5' NAVD
TCR Outlet Bridge	TBD	NW 50th ST over the outlet channel (705100 ft east, 1083300 ft north)
TCR North Cell		

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Water Control Components

Name	Description	Location
TCR Internal Structure	2-10' W x 14' H rectangular conduits with slide gates	Invert elevation ~ 40' NAVD
TCR Drawdown Structure (Internal)	2-6' H x 6' W gated box culverts	Invert elevation ~ 34' NAVD
TCR South Cell		
Pump Station S-191A	500 cfs	Between the LD-4 Canal and the C-59 canal (732500 ft east, 1042000 ft north)
Pump Station S-191B	500 cfs	Between the L-47 and the C-59 canal

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Water Control Components

Name	Description	Location
Pump Station S-191C	100 cfs	Between the L-47 and the C-59 canal
L-63S /L-64 divider culvert	Replace existing gated culvert with 3-10' x 10' gated box culverts	Invert elevation ~ 13' NAVD Maintain overtopping elevation = 28.3' NAVD 757700 ft east, 1029200 ft north
Dredging of L-64 Canal	Proposed cross-section should have 10' W bottom at an elevation of 10' NAVD, 3:1 side slopes	Between L-63S/L-64 divider culvert and LRSTA pump station
Bridge on Highway 15-B	Replace existing 6' x 6' box culvert with bridge	C.R. 15-B crosses over L-64 Canal (759500 ft east, 1028000 ft north)

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Water Control Components

Name	Description	Location
Weir to existing L-64 Canal	submerged 10' wide weir	in the existing canal SE of the pump intake bottom elevation ~ 17' NAVD weir crest ~ 20' NAVD
Lakeside Ranch STA Pump Station.	500 cfs pump station operate at stages of 15.7' NAVD (17.0 ft NGVD)	761100 ft east, 1026500 ft north
Lakeside Ranch STA Distribution channel	invert of 19.0' NAVD, 3:1 side slopes, bottom width that narrows from 50' wide at the pump intake to 15' wide north of the C-Train of cells	

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Water Control Components

Name	Description	Location
Lakeside Ranch STA Distribution culverts	A-Train: 2-6' x 6' box culverts distributed along the northern edge of the train, inverts at 19.4 ft NAVD B-Train: 3-6' x 6' box culverts distributed along the northern edge of the train, inverts at 19.3 ft NAVD C-Train: 2-4' H x 6' W box culverts distributed along the northern edge of the train, inverts at 19.1 ft NAVD	
STA cells		

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Water Control Components

Name	Description	Location
STA Interior Structures (with a drop in elevation between cells)	4 gated 6' x 6' box culverts each culvert is separated into two 30 ft lengths with a weir in the middle inverts are 2' below the cell bottom of the upstream cell side and 4' above the bottom of the collection channels	
STA Outlet Structures	4 gated outlet culverts for each of the trains modeled the same as the interior structures where there is a drop in elevation between cells (see above)	

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Water Control Components

Name	Description	Location
LRSTA Outlet Channel	bottom elevation ~ 4 ft NAVD at the end of the C-Train (upstream terminus near 771,900 east, 1,006,900 north), ~ 2 ft NAVD at the bottom of the B-Train,~ 0 ft NAVD at the bottom of the A-Train, ~ -1.0 ft NAVD at the intersection with the L-47 Canal (766,800 east, 1,006,300 north) depth ~ 14', bottom width 10', 3:1 side slopes	along the southern boundary of the property from east to west
LRSTA Outlet Bridge	TBD	S.R. 15/US98 across the outlet channel (approximately 767,200 east, 1,006,300 north)

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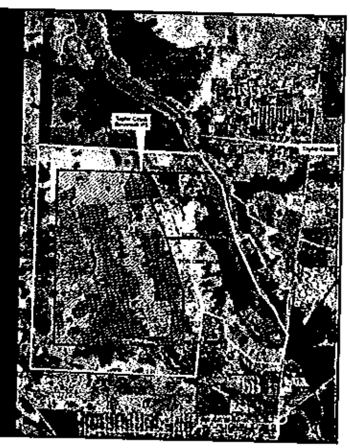
Water Control Components Taylor Creek



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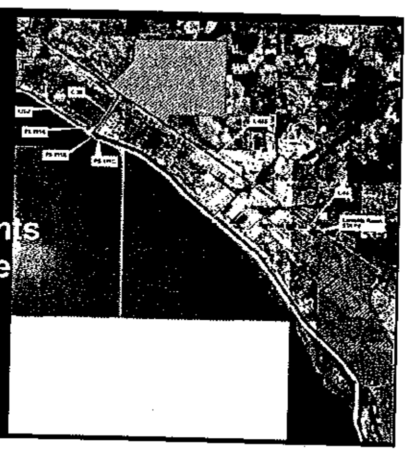
Water Control Components Lakeside Ranch



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Pump Stations

Stephen R. Martin, P.E., BCEE

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Designations and Locations of Pump Stations

Designations	Locations
Taylor Creek Reservoir PS	Taylor Creek Reservoir
Lakeside Ranch STA PS	Lakeside Ranch STA/S-133 Re-routing to S-135 (L-63S to L-64)
PS 191A	S-154 re-routing to S-135 (LD-4 to C-59)
PS 191B	S-191 re-routing to S-135 (L-47 to C-59)
PS 191C*	S-135 to Lake Okeechobee (L-47 to lake)*

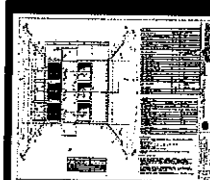
* Flood control application.

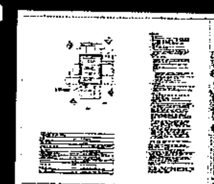
Location of Pump Stations

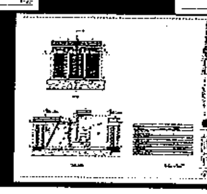
Typical Non-Flood Control Pump Station Criteria

- No need for standby pump or power.
- Pump stations can be simple w/ submersible electric axial or mixed flow propeller pumps and no superstructure (similar to Nubbin Slough STA Pump Station).
- Typically seven (7) pumps, three at 25% and four at 6.25% of design capacity.

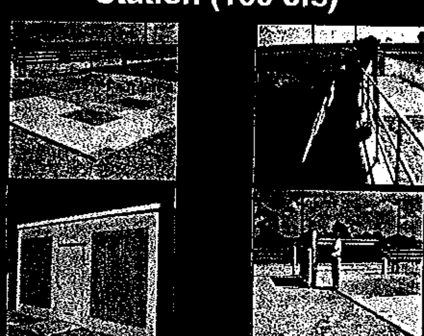
Typical Non-Flood Control Pump Station







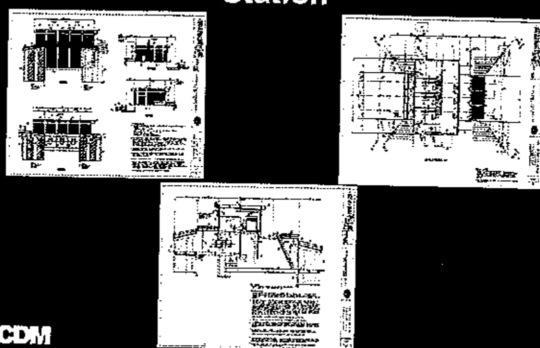
Typical Non-Flood Control Pump Station (160 cfs)



Typical Flood Control Pump Station Criteria

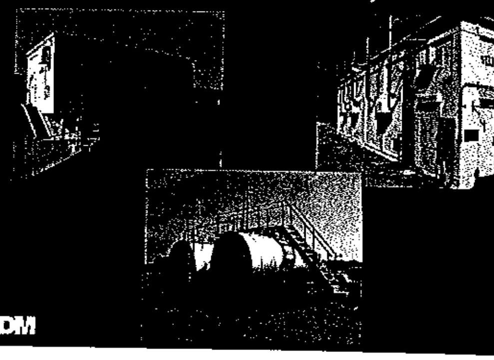
- Need standby pump and diesel engine direct drives for pumps.
- Typically five (5) pumps, each at 25% of design capacity.
- Vertical, axial flow pumps.
- Pump stations will have layouts per District's "Major Pumping Station Engineering Guidelines".

Typical Flood Control Pump Station



CDM

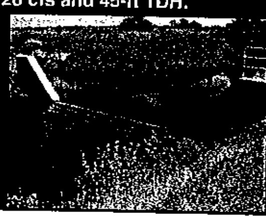
Typical Flood Control Pump Station (625 cfs)



CDM

Taylor Creek Reservoir Pump Station

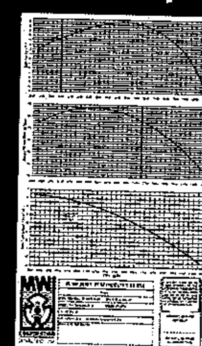
- Non-flood control.
- Located along Taylor Creek w/ discharge to reservoir.
- Design capacity of 500 cfs.
- Five (5) pumps at 83 cfs and 45-ft TDH each; plus three (3) pumps at 28 cfs and 45-ft TDH.



CDM

Taylor Creek Reservoir Pumps

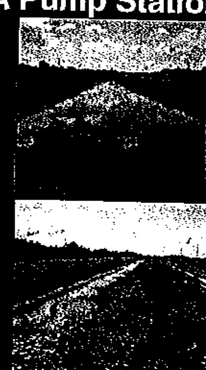
- Pump type: mixed flow
- Design point: 83 cfs @ 45-ft
- BHP @ design point: 635
- Efficiency @ design point: 80%
- Discharge diameter: 36-in
- Pump speed: 490 rpm
- Motor size: 700 hp



CDM

Lakeside Ranch STA Pump Station

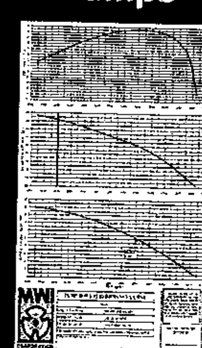
- Non-flood control.
- Located along improved L-64 at NW corner of STA.
- Design capacity of 500 cfs.
- Three (3) pumps at 125 cfs and 15-ft TDH each; plus four (4) pumps at 31 cfs and 15-ft TDH.



CDM

Lakeside Ranch STA Pumps

- Pump type: axial flow
- Design point: 125 cfs @ 15-ft
- BHP @ design point: 380
- Efficiency @ design point: 83%
- Discharge diameter: 36-in
- Pump speed: 440 rpm
- Motor size: 500 hp



CDM

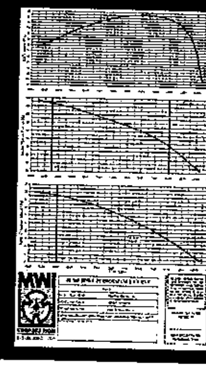
Pump Station S-191A

- Non-flood control.
- Located at east end of LD-4 w/ 1,000-ft discharge mains to C-59.
- Design capacity of 500 cfs.
- Three (3) pumps at 125 cfs and 15-ft TDH each; plus four (4) pumps at 31 cfs and 15-ft TDH.


CDM

PS S-191A Pumps

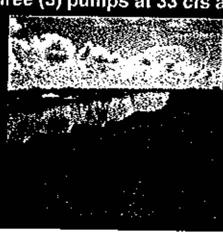
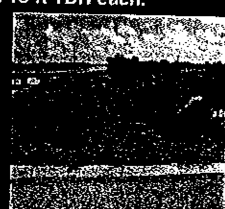
- Pump type: axial flow
- Design point: 125 cfs @ 15-ft
- BHP @ design point: 380
- Efficiency @ design point: 83%
- Discharge diameter: 36-in
- Pump speed: 440 rpm
- Motor size: 500 hp



CDM

Pump Station S-191C

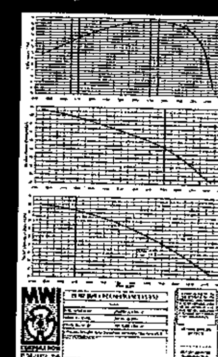
- Non-flood control.
- Located at west end of L-47.
- Discharge to C-59.
- Design capacity of 100 cfs.
- Three (3) pumps at 33 cfs and 15-ft TDH each.

CDM

PS S-191C Pumps

- Pump type: axial flow
- Design point: 33 cfs @ 15-ft
- BHP @ design point: 96
- Efficiency @ design point: 77%
- Discharge diameter: 24-in
- Pump speed: 705 rpm
- Motor size: 125 hp



CDM

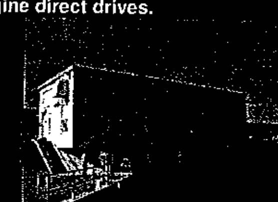
Structure S-135

- Pump station, lock and spillway
- Lock allows boat access to Lake Okeechobee.
- Spillway allows gravity flow to lake when lake WL < 13.5-ft.
- Pump station pumps to lake when L-47 WL = 14.0-ft.
- Four (4) diesel-driven pumps @ 125 cfs and 15-ft TDH each.

CDM

Pump Station S-191B

- Flood control.
- Located along L-47, probably near Structure S-191.
- Design capacity of 500 cfs.
- Five (5) vertical pumps at 125 cfs and 15-ft TDH each.
- Diesel engine direct drives.



CDM

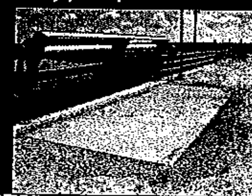
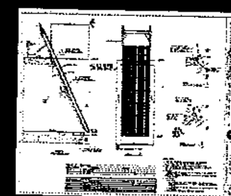
PS S-191B Pumps

- Pump type: axial flow
- Design point: 125 cfs @ 15-ft
- Efficiency @ design point: ??%
- Impeller diameter: 48-in
- Engine horsepower: ???
- Engine speed: ??? rpm

CDM

Intake Screening for Submersible Pump Stations

- Stainless steel bar rack w/ clear openings of 4-in.
- Mechanically (front) cleaned type.
- Screenings drop on concrete pad for drainage and easy pickup.

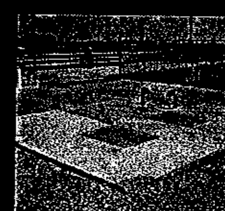
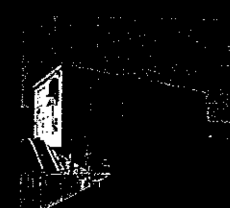
CDM

Seepage Criteria

- Seepage from Taylor Creek Reservoir to flow by gravity to one of the adjacent canals or creeks.
- Seepage from Lakeside Ranch STA to be pumped separately.

CDM

Structural/Architectural

- Pump stations will be designed to District's *"Major Pumping Station Engineering Guidelines"* and the Florida Building Code.

CDM

Discussion and Action Items

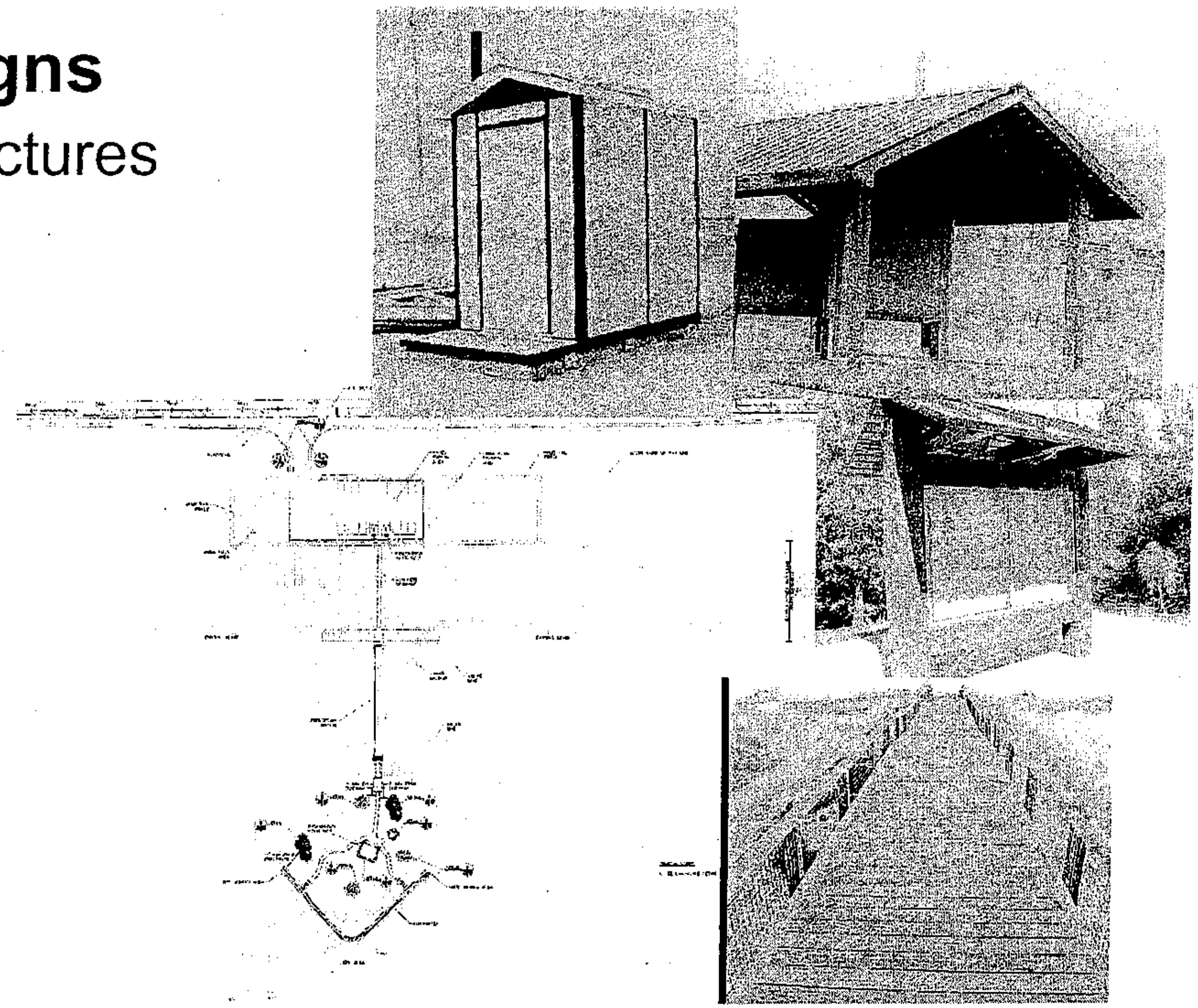
CDM

Acceler8 Recreation - LOFT

- **Public Recreational Access and Use Policy**
  - Access is a part of Design, Construction & Permitting
  - Project Purposes First
    - Appropriate recreation activities
    - Construction and operations not interfered with
- **Design helps Control Access**
  - Proximity to areas of interest concentrates people
  - Single access point

Acceler8 Recreation - LOFT

- **Standard Designs**
  - Recreation structures
- **Guidelines**
  - Parking lots
  - Boat ramps
  - Footbridges
    - Equestrian &
    - pedestrian
- **Site Designs for Reference**



Sept. 21, 2006

Acceler8 Recreation - LOFT
Access Design not Activity Management

Deep Impoundments	Shallow Impoundments	STAs	Enhanced Lands
Public Access site	Public Access site	Public Access site	Public Access site
Standard roads, bridges, ped/equestrian bridge if necessary & parking	Standard roads, bridges, ped/equestrian bridge if necessary & parking	Standard roads, bridges, ped/equestrian bridge if necessary & parking	Standard roads, bridges, ped/equestrian bridge if necessary & parking
ADA compliance	ADA compliance	ADA compliance	ADA compliance
Dry vault toilet	Dry vault toilet	Dry vault toilet	Dry vault toilet
Info kiosk	Info kiosk	info kiosk	Info kiosk
Benches	Benches	Benches	Benches
School bus access	School bus access	School bus access	School bus access
----------------------------------	----------------------------------	----------------------------------	----------------------------------
Canoe Launch sites	Canoe Launch sites	Canoe Launch sites to external canals only	Canoe Launch sites
Public motor boat ramp shared with O&M		Elongated turnouts and Filled Corners	Elongated turnouts and Filled Corners
		Boardwalks (limited)	Boardwalks (limited)

Sept. 21, 2006

Acceler8 Recreation - LOFT

- **Facilities support many activities**
  - Actual activities may change
    - Seasonally
    - User conflicts
    - Projects have different characteristics or as site matures
- **Recreation FAQs**
  - Security
    - Enhanced by proximity of people at a safe distance
  - Liability
    - Immunity for District's when open to public
  - Who Pays
    - Each project

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee Fast Track (LOFT) Project
Project Quality Management Meeting Minutes

March 8, 2006

I. ATTENDEES:

Mark Long	South Florida Water Management District (SFWMD)
Mike Schmidt	Camp Dresser & McKee Inc. (CDM) - JVL
David Collins	CDM - WPB
Bill Taylor	CDM - WPB
Charles Voss	CDM - ORL
Harry Cheng	CDM - ORL
Tom Nichols	CDM - ORL
Steve Whiteside	CDM - RAL
Tom Nye	CDM - MIA
Steve Martin	CDM - WPB
Lee Wiseman	CDM - ORL
Larry Schwartz	CDM - ORL
Rahul Sawant	CDM - WPB
Wendy Bolt	CDM - WPB
Jim Burphy	RCT Engineering, Inc.
Kathy Hall	Hall Land Surveying
Joe Biul	Southern Resource Mapping
Via Net Conference:	
Kirk Westphal	CDM - CAM
Bob Schreiber	CDM - CAM
Weixing Guo	CDM - FTM
Paul Hossain	CDM - ATL
Bill Nelson	CDM - ORL
David Alvarez	CDM - ORL
Steve Keen	CDM - CAM
Bill Spriggs	CDM - ORL
Rich Wagner	CDM - JVL

II. Stakeholders (Name and Role)

1. Harry Chen – PE for Task 5.3 GW Modeling
2. Tom Nichols – Task Manager for Task 3 Geotech
3. Rahul Sawant – PE for Task 5.2 Data Collection/Evaluation
4. Lee Wiseman – Task Manager for Task 5.2 GW Modeling, Coordinate Hydrogeologic investigation
5. David Collins – CO OIC –Client Relations – Overall Project Success
6. Bill Taylor – CDM Project Manager – Coordinate whole project, internal administration, coordinate subcontractors, Task Manager for Task 6
7. Steve Whiteside – In charge of Embankment Design, Task Advisor for Tasks 6 and 3, Task Manager for Task 4
8. Becky Simpson, Wendy Bolt - Admin

9. Mike Schmidt – Technical Project Manager – Overseeing all aspects of technical app
10. Jim Burphy – RCT – primary subconsultant – makes sure RCT meets all expectations – will assign EOR/ AOR as required – CADD support, structural, HVAC, plumbing
11. Steve Martin – Mechanical design (not HVAC/plumbing) designing pumps, etc.
12. Tom Nye – Task Manager on surface water modeling
13. Joe Bilu – Southern Resource Mapping – subconsultant - Aerial photogrammetry
14. Kathy Hall - Hall Land Surveying – Tasks 2.2.1 through 2.2.9 – survey
15. Larry Schwartz – Task Manager for Lakeside Ranch STA design, Drs. Kadlec & Walker will advise Larry
16. Bob Schreiber – Coordinate between Cambridge and Florida, help coordinate GW modeling, geotechnical, Senior Technical Advisor
17. Kirk Westphal – Task Manager, coordinating input/outputs to develop operations model (Lena will work with Kirk)
18. Steve Keen – National GIS Leader Technical reviewer, and enforce commitment of resources
19. David Alvarez – GIS tech for project (Task 1 and intersection with other tasks)
20. Bill Spriggs – Sr. Designer – coordinate graphics development
21. Bill Nelson – Technical Service Mgr, AES, Task 6 Electrical and Instrumentation (EOR for Instrumentation) Paul LeFave EOR for Electrical
22. Paul Hossain – assisting Kirk Westphal on operations model, TRC member
23. Rich Wagner – CDM discipline leader – water quality, advising hydrology and water quality
24. Weixing Guo – working with Harry Chen on GW modeling
25. Tim Miller – ATI - Subcontractor for Geotech & hydrogeologic investigation
26. Mark Long – SFWMD – Acceler8 Project Manager
27. Lena Rivera – Task Manager, water and phosphorus budget
28. John Ladner – TRC
29. W. Kirk Martin – TRC
30. Bob Fitzgerald – TRC
31. John Healy – TRC

III. Overview of Organizational Chart (see attached)

IV. Discussion of Scope of Work (see Work Order No. 10 dated April 14, 2006)

V. Discussion of Project Schedule (see attached)

VI. Mission Statement:
The CDM Team will work closely with the Acceler8 Team to complete the CDM-Contracted Lake Okeechobee Fast Track (LOFT) BODR project to provide maximum practicable total phosphorous removal for the available budget and footprint. The CDM Team will deliver the project on an accelerated schedule while delivering quality and innovation.

VII. Critical Success Factors
We must…
1. Identify Project components to achieve maximum practicable TP removal for the available budget and footprint relative to the LOFT conceptual plan goals.

2. Produce deliverables in compliance with both CDM and project quality management requirements.
3. Develop and maintain a critical path schedule.
4. Meet CDM project budget.
5. Identify and obtain the critical survey and geotechnical/hydrogeologic field data in compliance with project schedule.
6. Develop and follow project communication plan.
7. Promptly resolve model selection and application issues with the District throughout the modeling phase.
8. Coordinate our Project components with the Taylor Creek and Nubbin Slough Critical Project STAs and potential Nubbin Slough STA expansion.
9. Set up working models by Week 8 (Week of May 7th).
10. Determine Reservoir Design Alternatives (especially the height).

VIII. Items to be Addressed ("Parking Lot")

1. Any signing responsibility for Geotech
2. EOR - signing requirements for BODR
3. RCT - assign architect, structural, HVAC, plumbing (as required)
4. Confirm boundary of project aerial work- priority for sides
5. Better topo
6. Make sure survey locates borings (coordinate & Geotech)
7. Coordinate structural and Geotech
8. Define Schreiber's role and any repercussions
9. Define project QM process/ peer review for the project
10. Dedicate resources - particularly civil design
11. Revise ORG Chart and develop communication lines
12. Surveyors get SFWMD applicable standards
13. Graphics/CADD standards - get to Bill Spriggs
14. Assign a Lead Practitioner (LP) 13 assigned to the project, probably Mike Schmidt
15. Dam break analysis PE
16. Managing expectations
17. Incorporate PIR into overall schedule
18. Get coordinated with CCI re: cost estimating and scheduling
19. Coordinate fast track of Geotech/ survey & aerial survey
20. Prioritize survey - what data is needed first

IX. Project Influences

1. Costs
2. Budget
3. Make best use of available land
4. 1-2 years to grow wetlands
5. 2009 on-line - December 31, 2009
6. Phosphorus removal
7. 34 weeks for BODR
8. BODR due November 17, 2006
9. Draft BODR 28 weeks (after NTP) to completion
10. PIR report by ACOE & District

11. Expect NTP week of March 12, 2006
12. TRC May 7, 2006
13. Survey
14. Accelr8 program management
15. District grade
16. Weather - spring, hurricane
17. Geotech
18. Communication with subs
19. Budgeted cost
20. Construction costs
21. Site access
22. Subs on time
23. Communication with client
24. Staffing
25. Subconsultant - priority direction
26. Gas pipeline in the way
27. Reroute 154
28. Contamination legacies near Taylor Creek site
29. T&E
30. Houses in proximity of dam
31. Cut out T&E from scope
32. Cut out Archeological from scope
33. Test Cell
34. Gas pipeline affects both cells
35. Coordination of all information
36. Dissemination of info
37. Document control
38. Data storage
39. Compressed schedule
40. Property owner coordination
41. Security on jobsite
42. Forested wetlands
43. District QM forms
44. Model selection
45. District BODR criteria
46. Overall getting to understand District - rules, policies, procedures, standards
47. Data local municipalities
48. Power for pump stations
49. Nubbin Slough Issues
50. Housing & coordination Geotech field people
51. Middle of "nowhere"
52. Lodging near project site
53. Schedule for bass fishing tournament
54. No float in schedule
55. Develop detailed BODR schedule
56. Height of levee
57. Size of the reservoir - water depth
58. Phosphorus removal in the reservoir

59. Legislative funding
60. Strings on funding
61. Cows
62. Placement of piezometers
63. Control access to equipment
64. Management of drilling materials
65. Survey control
66. Availability of utilities
67. Water for drilling
68. Water quality data selection
69. Operations of system
70. O&M
71. Hydromentia
72. Alternate treatment technologies
73. Data requisition issues – including data documentation as to how the data was collected
74. Mix of scales
75. Different software platforms
76. Datum
77. Model compatibility
78. Accuracy of 0.33 for aerial
79. Formats, table of contents, get done ASAP
80. Trends in WQ Data
81. WQ concentrations may be lower than expected
82. No prescribed P removal goal
83. Some entities have P removal goals in their heads
84. Target for P removal is confused
85. 50 to 70 MT/yr TP removal goal
86. Clearly define project roles/responsibilities for each Task in the Scope of Work
87. Unforeseen conditions in exploration phase
88. What if we identify a major cost issue
89. Waiting on EA data
90. Example BODR
91. Clarity with all parties about Scope of CDM modeling work
92. Spatial extent of model
93. Offsite impacts of groundwater criteria
94. 0, 0.1 ft, 0.5 ft of GW impact
95. Nearby property owners may interfere
96. Stakeholder buy-in
97. Governor Bush
98. Senator Pruitt
99. GW seepage
100. ACOE
101. Dam break analysis
102. FP&L
103. Potential litigation
104. Environmental groups
105. Due diligence work

106. Was due diligence done to satisfaction of A8 team?
107. Boundary survey
108. Number of alternatives required in scope – is there a limit
109. Basis of CDM budget for scope of work
110. Dr Checks
111. Reviewers of last work product we produced
112. Letter of permission from District for surveyor property access
113. Boat access for Technos
114. Police department in area
115. Notify police
116. Team member access
117. Weekly progress meetings

Enclosures: Organization Chart
Map
Project Deliverable Schedule
Project Personnel Directory

c: Attendees

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P.E., DEE
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P.E.
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Permitting

Ana Carmen V. DeMelo, P.E.
Patrick R. Victor, P.E.
Suzanne E. Meyer, P.E.
Estus D. Whitfield

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Reservoir – STA Siting and Operations

Kirk S. Westphal, P.E.
Stephen M. Hoffman
Lena Rivera, P.E.

Scheduling a Cost Estimati

Nicholas Maxin, Jr.,
Pamela R. Dani
Jessica M. Torr
Craig A. Gadberry,

Surveying

en L. Hall Land Surveying, Inc. (WBE)
uthern Resource Mapping of Miami

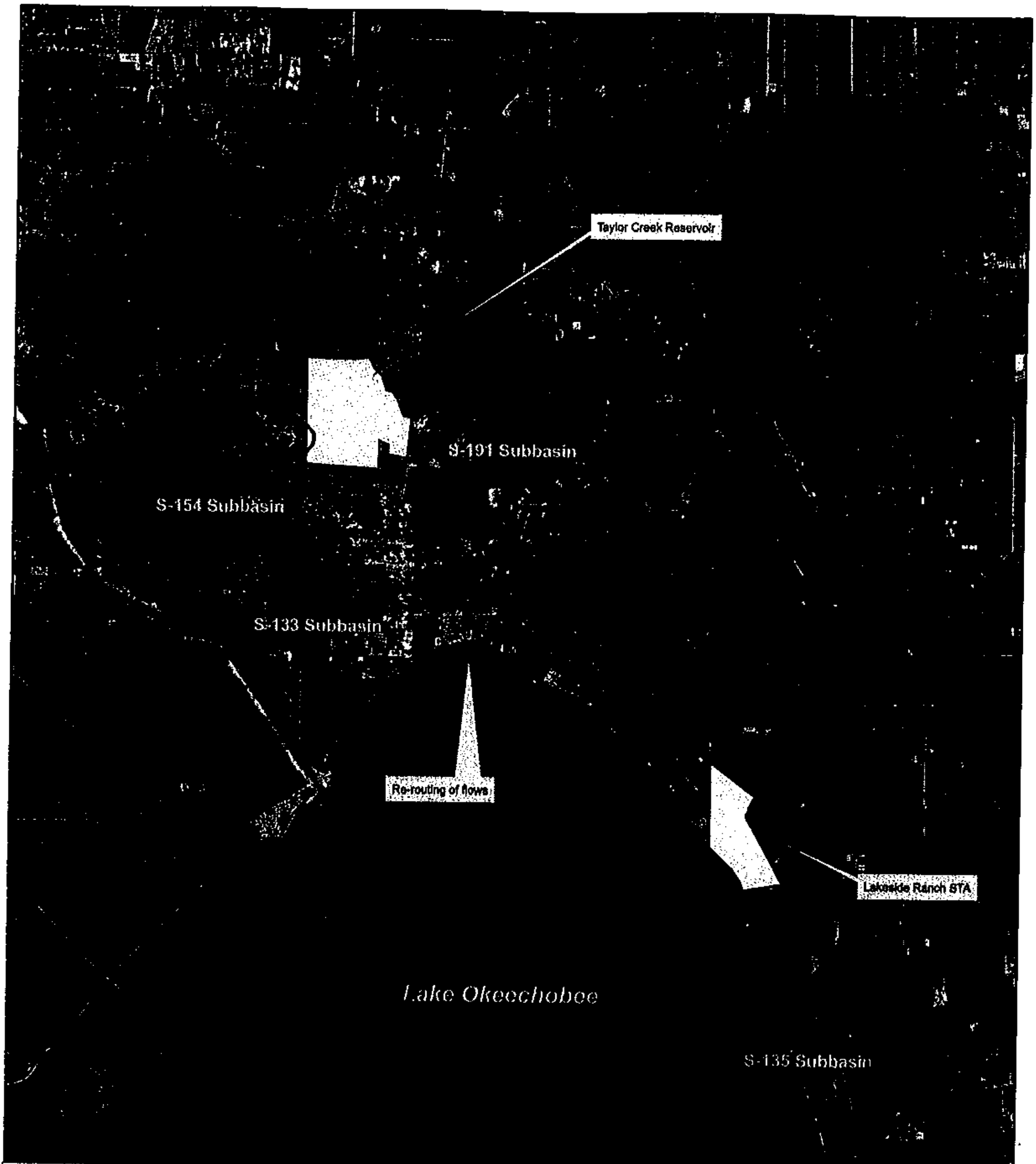
Structural Engineering

James V. Burphy, P.E.
William Kiahon, P.E.
Francis Sirleaf

John
R.C

Electrical

Paul A. Lefave, P.E.
John M. Sanchez, P.E.

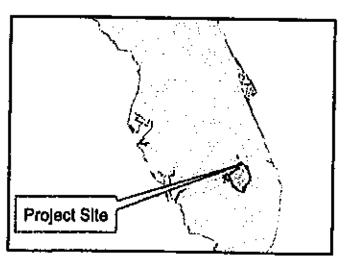


O:\Sawantr\LOFT\TASK 4\Aerial Photogrametry\ Figure 1-1.mxd RRS 12-20-2005

source: Aerial file provided by HDR (2003)

Legend

- S-133 Subbasin
- S-135 Subbasin
- S-154 Subbasin
- S-191 Subbasin
- Lakeside Ranch STA
- Taylor Creek Reservoir
- Flow Re-routing



N W E S

0 1.5 3 6 Miles

LOFT Components

LOFT Project
Project Site

CDM

Figure 1-1

Deliverable	Deliverable Description	Week from NTP	Due Date (from NTP)	Engineer of Record
Task 1 Project Management and Coordination				
1.1	Project Management and Coordination	Monthly	Monthly	
1.2	QA/QC Plan	4 weeks	May 12, 2006	
1.3	Project Quality Management Meeting and summary notes	1 week	April 21, 2006	
1.4	Critical Path Project Schedule, including monthly updates	Monthly	14th of month	
1.5	Project Work Plan	4 weeks	May 12, 2006	
1.6	Critical Path Decision Making Meetings (4 meetings)	As Required	As Required	
1.7	Progress Review Meeting Summaries (8 meetings)	Monthly	14th of month	
1.8	Attendance and presentation at CCM, including meeting summary notes	22 weeks	September 15, 2006	
1.9	Project Stakeholder briefings (3 meetings)	As Required	As Required	
1.10	WRAC briefing (1 meeting)	29 weeks	November 3, 2006	
1.11	District management briefing (1 meeting)	As Required	As Required	
1.12	Utility meetings, including presentation and handouts (4 meetings)	As Required	As Required	
1.13.1	Project Documentation Control Plan	4 weeks	May 12, 2006	
1.13.2	Electronic Copy of Project Documentation	34 weeks	December 8, 2006	
1.14.1	GIS Data Control Plan	4 weeks	May 12, 2006	
1.14.2	Electronic Copy of GIS Data	34 weeks	December 8, 2006	
1.15	District Governing Board briefing (1 meeting), including meeting graphics and handouts	As Required	As Required	
1.16	Taylor Creek Reservoir Test Cell Recommendation Memorandum	2 weeks	April 28, 2006	
Task 2 Surveys				
2.1	Survey Package	12 weeks	July 7, 2006	
2.2	Geotechnical Boring / Test Locations Surveys	24 weeks	September 29, 2006	

Task 3 Hydrogeologic and Geotechnical Field Investigations and Laboratory Testing				
3.1	Field Investigation Results	16 weeks	August 4, 2006	Tom Nichols
3.2	Laboratory Test Data and Results	22 weeks	September 15, 2006	Tom Nichols
Task 4 Geotechnical Analysis and Design Services				
4.2.1	Seepage and Control Report Section (Draft)	18 weeks	August 18, 2006	Steve Whiteside
4.3.1	Seepage Canal Analysis Report Section (Draft)	18 weeks	August 18, 2006	Steve Whiteside
4.4.1	Wave Run-up and Erosion Protection Report Section (Draft)	18 weeks	August 18, 2006	Steve Whiteside
4.6.2.1	Geotechnical Data Report	28 weeks	October 27, 2006	Steve Whiteside
Task 5 Hydrologic, Hydraulic, Water Quality, and Operations Model Evaluations				
5.1.1	Draft Model Evaluations and Recommendations Technical Memorandum	6 weeks	May 26, 2006	
5.1.2	Presentation of the Technical Memorandum to the IMC	8 weeks	June 9, 2006	
5.1.3	Final Model Evaluations and Recommendations Technical Memorandum	9 weeks	June 16, 2006	Mike Schmidt
5.3.7	Groundwater Model Evaluations report Section (Draft)	28 weeks	October 27, 2006	Lee Wiseman
5.4.14.1	Draft Hydraulic Model Analyses Report	22 weeks	September 15, 2006	Tom Nye
5.5.2.1	Draft PMP/Dam Break Summary Report Section	22 weeks	September 15, 2006	TBD
5.6.1.1	Draft STA Design Analysis Report Section	22 weeks	September 15, 2006	Mike Schmidt
5.7.1	Water and Total Phosphorous Budget Report Section (Draft)	16 weeks	August 4, 2006	Lena Rivera
5.8.1	Draft Watershed, Systems and Operations Model and Evaluations Report Section	22 weeks	September 15, 2006	Kirk Westphal
Task 6 Basis of Design and Report				
6.15.3.1	Draft BODR Document (10 Hard Copies and 25 PDF Versions on CDs)	28 weeks	October 27, 2006	
6.15.3.2	Support for Technical Review Process	32 weeks	November 24, 2006	
6.15.3.3	Final BODR Document (5 Hard Copies and 25 PDF Versions on CDs)	34 weeks	December 8, 2006	Mike Schmidt

South Florida Water Management District
Lake Okeechobee Fast Track Project

Project Personnel Directory

Name	Company	Telephone	FAX	E-mail	Project Role
Mark Long	SFWMD	242-5520 x4061	561-644-4292	malong@sfwmd.gov	Client Project Manager
Dave Collins	CDM	561-689-3336	561-689-9713	collinsdl@cdm.com	Client Officer
Mike Schmidt	CDM	904-731-7109	904-731-0465	schmidtmf@cdm.com	Project Technical Manager Lead Practitioner Overall Engineer of Record Task 5 Eval Manager Task 5 PMPDF Manager
Bill Taylor	CDM	561-689-3336	561-689-9713	taylorwk@cdm.com	Project Manager
Pat Gleason	CDM	561-689-3336	561-689-9713	gleasonpj@cdm.com	Task 5 Data Manager
Charlie Voss	CDM	407-660-2552	407-875-1161	vosscj@cdm.com	Advisor
Becky Simpson	CDM	561-689-3336	561-689-9713	simpsonre@cdm.com	Quality Assurance Officer
Bob Schreiber	CDM	617-452-6000	617-452-8000	schreiberrp@cdm.com	Project Admin
Paul Hossain	CDM	404-720-1400	404-467-4130	hossainr@cdm.com	TRC Chair
John Ladner	CDM	407-660-2552	407-875-1161	ladnerjg@cdm.com	TRC Committee
W. Kirk Martin	CDM	239-432-9494	239-432-9453	martinwk@cdm.com	TRC Committee
Bob Fitzgerald	CDM	617-452-6000	617-452-8000	fitzgeraldrh@cdm.com	TRC Committee
Tom Nichols	CDM	407-660-2552	407-875-1161	nicholstw@cdm.com	TRC Committee
Steve Whiteside	CDM	919-787-5620	919-781-5730	whitesidesl@cdm.com	Task 3 Manager
Lee Wiseman	CDM	407-660-2552	407-875-1161	wisemanl@cdm.com	Task 4 Manager
Tom Nye	CDM	305-372-7171	305-372-9167	nyete@cdm.com	Task 5 GWMOD Manager
Larry Schwartz	CDM	407-660-2552	407-875-1161	schwartzln@cdm.com	Task 5 HHMOD Manager
Lena Rivera	CDM	407-660-2552	407-875-1161	riveral@cdm.com	Task 5 STA Manager
Kirk Westphal	CDM	617-452-6000	617-452-8000	westphalks@cdm.com	Task 5 WTPBA Manager
Steve Martin	CDM	561-689-3336	561-689-9713	martinsr@cdm.com	Task 5 WSOME Manager
Jim Burphy	RCT	561-684-7534	561-684-2801	jburphy@rctengineering.com	Task 6 MECH Manager
Kathy Hall	Hall Land Surveying	561-443-0426	561-443-0429	Hall4103@bellsouth.net	Subconsultant
Joe Bilu	Southern Resource	305-655-2211	305-655-0690	srmmiami@aol.com	Subconsultant
Carlos Lemos	Ambient Technologies	727-328-0268	727-328-2477	carlos@ambienttech.com	Subconsultant
Lynn Yuhr	Technos	305-718-9594	305-718-9621	info@technos-inc.com	Subconsultant

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
Critical Path Decision Making Meeting No. 1 Summary

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
August 3, 2006

Attending

Name	Affiliation	Phone Number
Jeff Kivett	Acceler8	561-242-5520
Mark Long	Acceler8	561-242-5520
Alan Hall	Acceler8	561-242-5520
Sean Williams	Acceler8	561-242-5520
Bruce Phillips	Acceler8	561-242-5520
Max Day	Acceler8	561-242-5520
Agnes Ramsey	Acceler8	561-242-5520
Becky Hachenburg	Acceler8	561-242-5520
Harold Aiken	Acceler8	561-242-5520
Paul Warner	Acceler8	561-242-5520
David Unsell	SFWMD	561-682-6888
Lisa Kreiger	SFWMD	863-462-5260
Rick Nevulis	SFWMD	561-682-6242
Martin Falmlen	USACE	
Dave Collins	CDM	561-689-3336
Bill Taylor	CDM	561-689-3336
Giana Wong	CDM	407-660-2552
Mike Schmidt	CDM	904-731-7109
Steve Whiteside	CDM	919-787-5620
Lee Wiseman (call-in)	CDM	407-660-2552
Kirk Westphal (call-in)	CDM	617-452-6000
Lena Rivera (call-in)	CDM	407-660-2552
Tammy Martin	RCT Engineering	561-689-3336

Proceedings:

- Overview by Mark Long
- Introductions
- *Lake Okeechobee Fast Track (LOFT) Project Basis of Design Report (BODR) Critical Path Meeting Presentation* by Mike Schmidt
  - Agenda
  - Project Goals
  - LOFT Project Components
    - Taylor Creek Reservoir
    - Lakeside Ranch STA
    - S-133 Sub-basin Re-routing

- S-154 Sub-basin Re-routing
- Water and Total Phosphorous Budgets
- Taylor Creek Reservoir
  - Constraints
  - Features
  - Configuration Options
  - Treatment Options
- Lakeside Ranch STA
  - Constraints
  - Features
  - Configuration Options
  - Treatment Options
- Test Cells

■ Discussion
- Construction of the Taylor Creek STA was completed August 2005 but it is not yet flowing. A combination of permitting issues and paperwork issues is holding up operation of the STA. The water currently in the STA is from rainwater and the vegetation appeared naturally without outside assistance.
- Final design has been approved for the Nubbin Slough Expansion STA. The total area of the Expansion is 500 acres (1 cell @ 330 acres and 1 cell @ 170 acres).
- The routines from DMSTA will be coded into the STELLA model for phosphorous removal with flows.
- The model assumes no withdrawals of water from Lake Okeechobee. However, one possible scenario could be to draw from the lake during drought periods to keep the STAs hydrated.
- Lisa Kreiger confirmed that there are some contamination issues on property located adjacent to site from old chemicals in the cattle barns and trash. She has the Environmental Assessment report, which discusses these issues and will forward a copy to CDM.
- Mike Schmidt posed the question about removing legacy phosphorus and manure from the Taylor Creek site and selling compost/fertilizer. Lisa Kreiger asked about the extent of phosphorus concentrations at the site and questioned whether it was enough to be a problem. Dave Unsell stated it was worthwhile to look into these issues further.
- Jeff Kivett recommended that CDM complete a cost analysis of building an internal levee to determine if internal levees have benefit. He stated that most of the Acceler8 reservoir project studies have found it is more costly to put in internal levees and C-43 is the only project reservoir to have one included in the design.
- Jeff Kivet pointed out the inconsistency of removing legacy phosphorus and collecting phosphorus in the reservoir through sedimentation. Mike Schmidt stated that there will be a maintenance component to phosphorus collection. Jeff recommended including this maintenance in the operations costs when preparing the cost analysis.
- Agnes Ramsey stated that a Consumptive Use permit may be required if water will be drawn from other locations to maintain a five foot minimum water depth in the Taylor Creek Reservoir during dry periods. Mike Schmidt asked whether the STAs require these permits. Jeff Kivett stated that the STAs do not have these permits because they are not guaranteed to receive water to keep them hydrated.
- Jeff Kivett asked whether adding a reservoir at the Lakeside Ranch is a viable solution under the PIR. Dave Unsell stated that it's difficult to tell because it could be considered

a design refinement or a reformulation change. Dave stated it is definitely not considered in the PIR. Jeff stated that the PIR has the STA twice as big as the current configuration at Lakeside Ranch. Dave stated it is a persuasive plus if the same treatment specified in the PIR is maintained using different technology on a smaller footprint.

- Alan Hall asked if the materials from the test cell borrow area could provide any information about the legacy phosphorus. Mike Schmidt stated that CDM's soil chemistry team is planning to utilize some of those areas.
- Becky Hachenburg asked for an explanation of the difference between the two test cells. Bill Taylor stated one test cell will have a slurry wall and the other test cell will not have one. Steve Whiteside stated that CDM will also use the test cells to look at different designs, different seepage controls, different materials for the cross sections of the embankment.
- Becky Hachenburg asked if the test cells will have a water quality monitoring phase associated with them or if they are solely for engineering constructability evaluation. Jeff Kivett stated they will be only for assessing engineering constructability.
- Jeff Kivett asked if CDM will be able to develop the two alternatives without the STELLA model being complete. Mike Schmidt stated that the initial WAM models were off by approximately 50 percent on volume. His team has been working on finalizing the WAM models to get the data to the STELLA team.
- Dave Unsell asked about the accuracy of the WAM model results. Mike stated that after comparing the initial model results to the DBHYDRO data, his team has learned that the WAM model is under-predicting and is off on some of the volumes by as much as 50 percent. Martin Falmlen asked if, based upon the data in DBHYDRO, the Okeechobee Watershed Project underestimated the amount of water available. Dave Unsell asked Mike to provide information on which basins show deviations.
- Lee Wiseman was asked if there could be an option without a slurry wall as part of the seepage management system where there are acceptable limits to the seepage mounding off site. Lee Wiseman stated that there must be some type of seepage control, which will likely be a slurry wall and toe drain. Bill Taylor stated one of the main reasons for building the test cells is to evaluate these options.

CDM

SFWMD

Lake Okeechobee Fast Track (LOFT) Project

Basis of Design Report (BODR)

Critical Path Meeting

August 3, 2006

Agenda

- Test Cells
- Discussion and Action Items

Agenda

- Introduction
- Project Goals
- LOFT Project Components
  - Taylor Creek Reservoir
  - Lakeside Ranch STA
  - S-133 Subbasin Re-routing
  - S-154 Subbasin Re-routing
- Water and Total Phosphorous Budgets

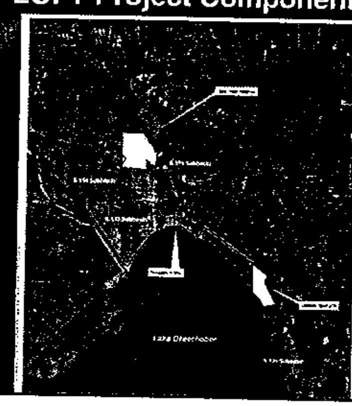
Project Goals

- Achieve Maximum Total Phosphorous Removal for the Available Budget
- Implement the Necessary Project Components by End of 2009

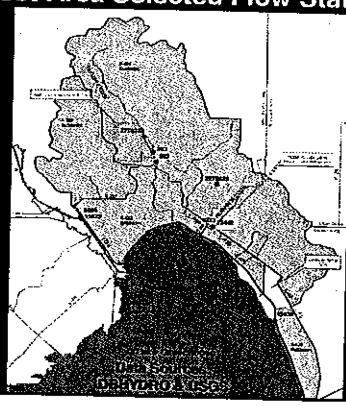
Agenda

- Taylor Creek Reservoir
  - Constraints
  - Features
  - Configuration Options
  - Treatment Options
- Lakeside Ranch STA
  - Constraints
  - Features
  - Configuration Options
  - Treatment Options

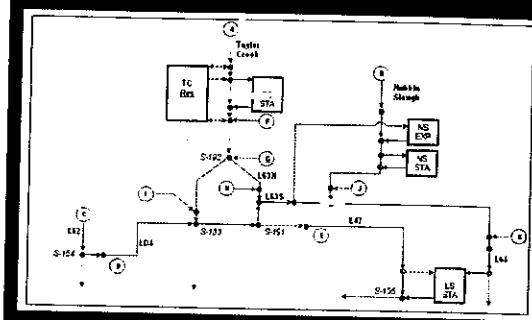
LOFT Project Components



Project Area Selected Flow Stations



Preliminary Input Data: USGS/DBHYDRO: 1972-1989



Data Availability & Evaluation

- Obtained water quality data from DBHYDRO for project area
- Period of Record Analyzed: 1972-1989 & 2004-2005
- Determined land use and contributing area per sub-basin
- Reviewed published values for areal pollutant loading rates (land use specific)

Basic Flow Logic

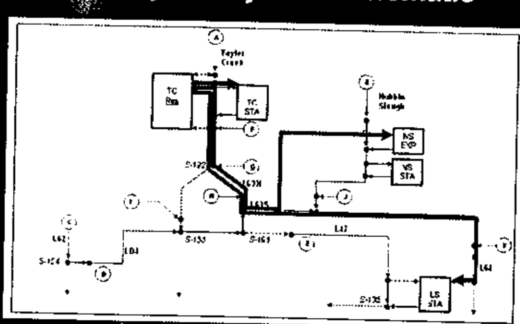
Reservoir

- Water pumped into reservoir whenever it is below max water level.
- Water released from reservoir when any STA water level reaches specified trigger (e.g. 30% of storage above weir)
- No outflows allowed if water is below minimum specified level.

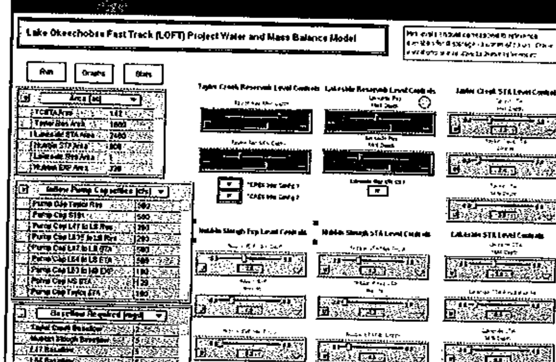
STAs

- Water pumped into STAs whenever they are below max water level.
- Water released from STAs according to weir equations
  - Gates are partially closed (weir raised) when no flow is going *into* an STA
- Model constrained to leave specified baseflow in streams/canals

Conceptual System Schematic



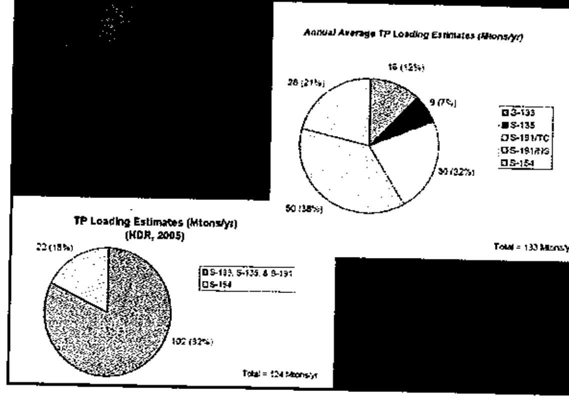
Model Input



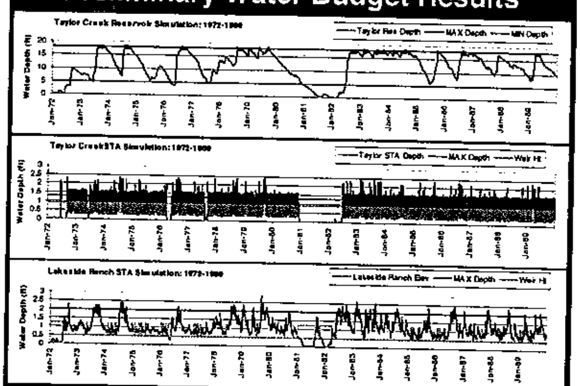
Preliminary Configurations

- Surface Areas:
  - Reservoir: 1600 acres
  - Taylor Creek STA: 142 acres
  - Nubbin Slough Critical STA: 809 acres
  - Nubbin Slough Expansion: 330 acres
  - Lakeside Ranch STA: 2400 acres
- Reservoir operating range: 5 Ft min, 18 Ft max
- STA operating range: ~0.5 Ft min, ~1.5 Ft – 2 Ft max
- Pump capacities: 200 – 500 cfs
- Reservoir releases triggered when STAs go below 30% of storage above weir
- Rerouted flows from S154 and S133 directed to L63S

Preliminary TP Load Contributions



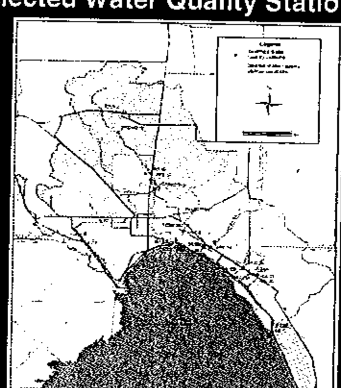
Preliminary Water Budget Results



Water and TP Budget Conclusions

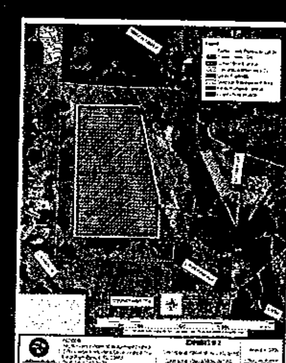
- Final recommendations contingent on processing full input record (simulated) from 1965-2005
- It appears that a reservoir with a footprint of 1,600 acres will be sufficient to keep the STAs hydrated except in cases of extreme drought
- Amount of water captured is more sensitive to operating rules than reservoir size above 1600 acres
- Metrics of water capture and phosphorus removal will be used to "tune" the configuration and triggers. Final estimates of phosphorus analysis will rely on DMSTA

Selected Water Quality Stations



Data Source:
DBHYDRO

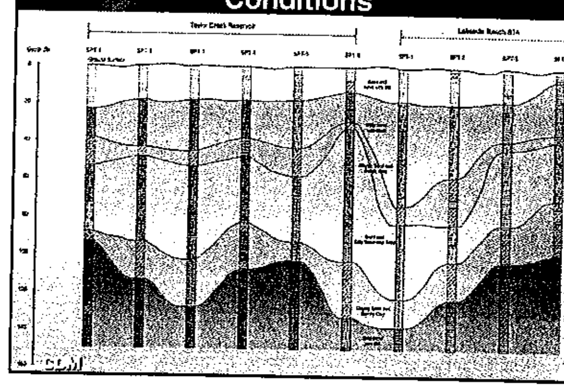
Taylor Creek Reservoir



Taylor Creek Reservoir Constraints and Issues

1. The reservoir shall capture the greatest volume of water and mass of total phosphorus possible for the available funding
2. The reservoir shall be sited on SFWMD land
3. The use of the Okeechobee County school board lease on the southern portion of Taylor Creek's west bank should be avoided
4. The reservoir shall be located and designed with public safety as a primary consideration

Site-Specific Subsurface Conditions



Taylor Creek Reservoir Constraints and Issues

5. Only lands west of the existing access road shall be used in the footprint of the reservoir
6. Consider potential impacts to offsite lands (wells, septic tanks, GW), therefore, buffers and the seepage management system setbacks must be provided
7. Groundwater contamination located near the southern residential communities should be considered
8. Avoid Impacts to the 36-inch gas main

Taylor Creek Reservoir Constraints and Issues

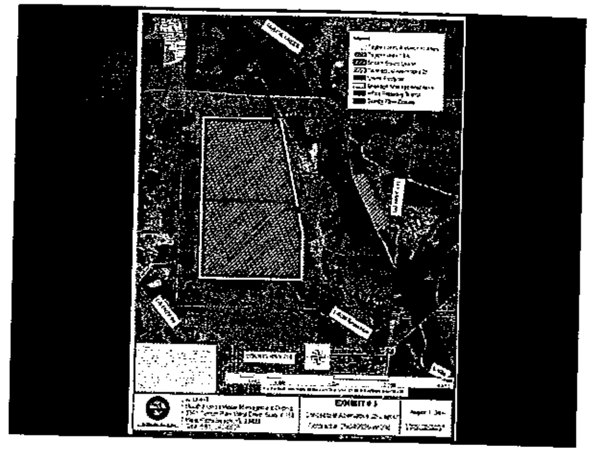
9. Adverse effects on the Taylor Creek Algal Turf Scrubber System shall be avoided
10. The potential discovery of archeological resources may require the formulation of additional considerations
11. Impacts to existing wetlands should be limited or avoided
12. The outlet should be located to improve operational flexibility and residence time

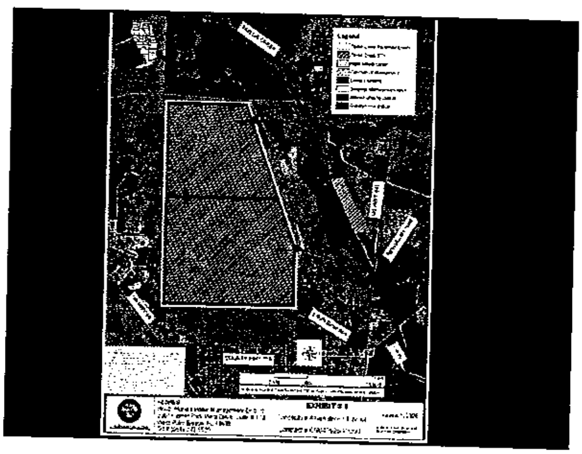
Taylor Creek Reservoir Constraints and Issues

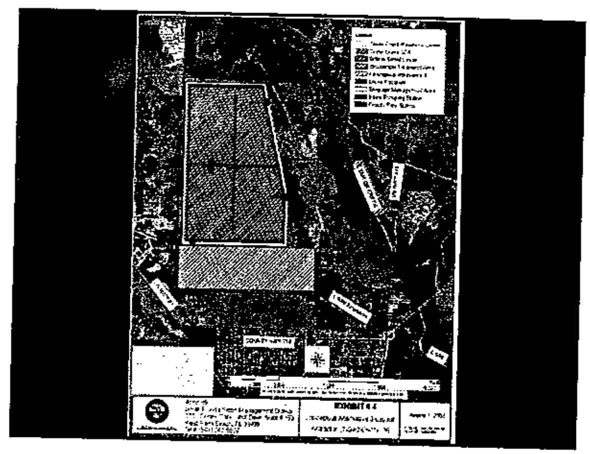
13. Reservoir levees should travel in straight lines and if possible form a rectangular shape to reduce costs
14. The reservoir should have internal levee(s) to reduce wind fetch and wave run-up
15. Internal levee(s) should also be considered to increase residence time
16. Onsite manure and legacy TP must be addressed

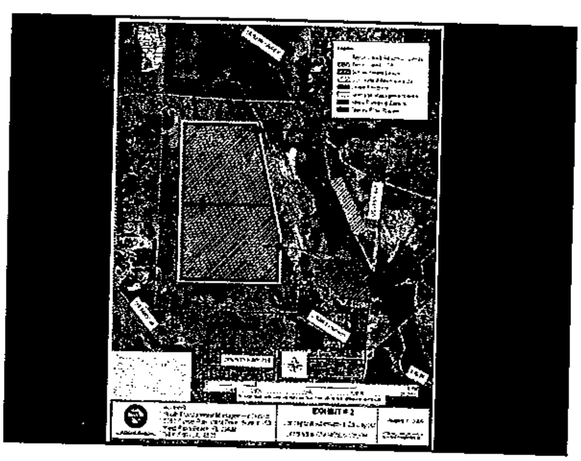
Reservoir Features

Reservoir Parameter	Alternative 1	Alternatives 2a and 2b	Alternative 3
Pool Area (Ac)	2,745	1,600	1,600
Max Pool Depth (Ft)	12	18	18
Max Pool Volume (Ac-Ft)	32,000	28,800	28,800
Dam Height (Ft)	22	28	28









Taylor Creek Reservoir Treatment Options

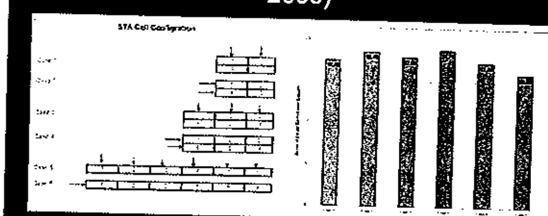
- Maintain permanent pool in reservoir to achieve removal similar to wet detention (30 to 80 % TP)
- Add STAs
- Add ATSs
- Recirculate if needed

Lakeside Ranch STA Constraints and Issues

5. Conveyance improvements for the canals to the STA are constrained by limited easements and the railroad
6. Consider potential impacts to offsite lands (e.g., building foundations, wells, septic tanks, GW), therefore, buffers and the seepage management system must be provided
7. STA levees should travel in straight lines and if possible form a rectangular shape to reduce costs
8. Avoid impacts to the 36-inch gas main and fiber optic line

Lakeside Ranch STA

STA Cell Configuration Analyses (HDR, 2005)



- Higher annual load reduction with longitudinal flow (Cases 2 and 4)
- Similar annual load reduction for 4 cells versus 6 cells

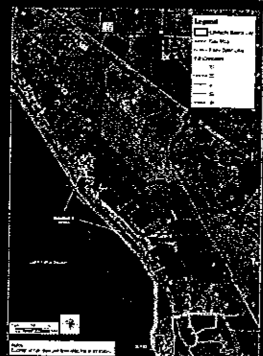
Lakeside Ranch STA Constraints and Issues

1. The STA should work in coordination with Taylor Creek Reservoir-STA and Nubbin Slough STAs to Maximize TP Removal (recirculation could be a major issue)
2. Onsite manure and legacy TP must be addressed
3. Wetlands and habitat should be incorporated and enhanced if possible
4. Topographic variation must be considered in the design

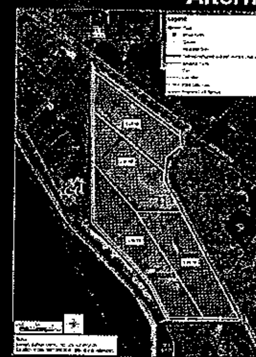
Lakeside Ranch STA Treatment Options

- STAs
- ATSs
- Add a permanent pool forebay
- Add a reservoir to capture and attenuate flows
- Recirculate if needed

Lakeside Ranch Existing Site

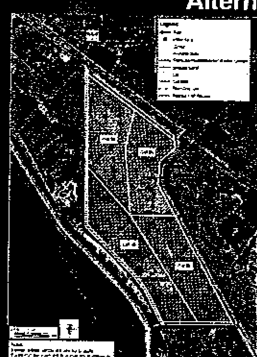


Lakeside Ranch Conceptual Alternative 2



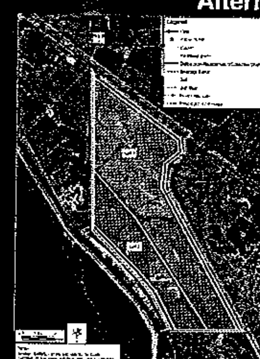
- 4 Cells
  - 2 Distribution Cells in Series followed by 2 Cells in Parallel
- Northwest Intake Location
- Distribution/Redistribution/ Collection Channels
- Discharge to L-47 to S-135
- Seepage Canal on West
- Terraced Berms at Elevation Drop

Lakeside Ranch Conceptual Alternative 1



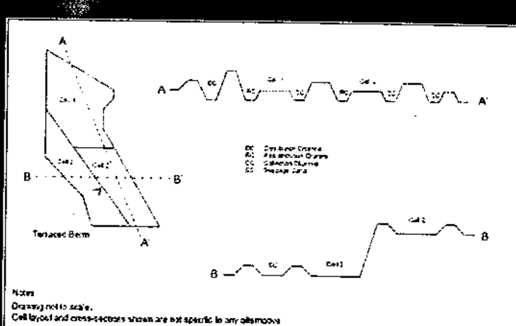
- 4 Cells
  - 2 Parallel Flow Pathways with 2 Cells in Series
- Northwest Intake Location
- Distribution/Redistribution/ Collection Channels
- Discharge to L-47 to S-135
- Seepage Canal on West
- Terraced Berms at Elevation Drop

Lakeside Ranch Conceptual Alternative 3

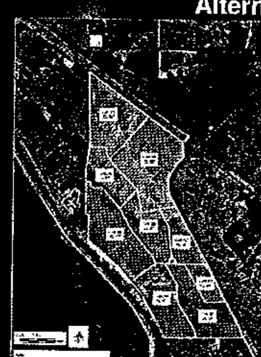


- 2 Cells in Series
- Northwest Intake Location
- Distribution/Redistribution/ Collection Channels
- Discharge to L-47 to S-135
- Seepage Canal on West and South
- Terraced Berm at Elevation Drop
- Lower Aspect Ratio (L/W)

Conceptual Cross Sections



Lakeside Ranch Conceptual Alternative 4



- 9 Cells
- Cell Configuration Based on Existing Topography
- Terraced Berms at Elevation Drop
- Distribution/Redistribution/ Collection Channels to be Determined
- Minimizes earthwork

Test Cell Objectives

- Obtain seepage data (recoverable and non-recoverable)
- Evaluate seepage control systems including soil-bentonite cutoff wall
- Evaluate stability of onsite materials
- Determine potential construction issues relative to dewatering and excavation

CDM

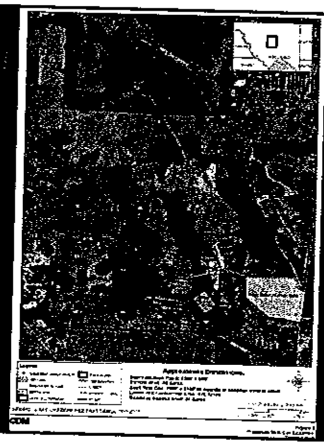
SFWMD

Lake Okeechobee Fast Track (LOFT) Project

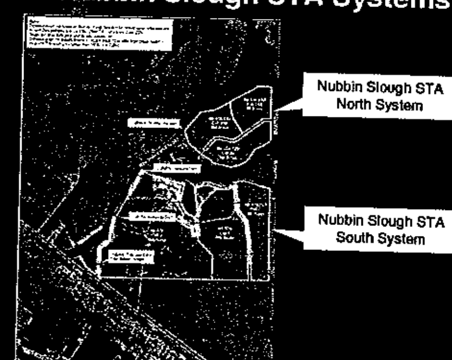
Basis of Design Report (BODR)

Critical Path Meeting

August 3, 2006



Nubbin Slough STA Systems



Discussion and Action Items

- Refine water and TP budget analyses
- Choose two alternative reservoir and STA configurations for detailed analyses
- Commence test cell design and permitting

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
Monthly Progress Review Meeting No. 1 Summary

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
May 30, 2006

Attending

Name	Affiliation	Phone Number
Jeff Kivett	Acceler8	561-242-5520
Mark Long	Acceler8	561-242-5520
Dave Collins	CDM	561-689-3336
Bill Taylor	CDM	561-689-3336

I. Monthly Status Report

- Bill Taylor reviewed the following items from the Monthly Status Report for the Period April 14 to May 14, 2006.
  - Activities accomplished in the previous month.
  - Problems and present concerns encountered in the Project.
  - Planned activities for the next month.
  - Project schedule.
- Monthly Status Report No. 1 is attached for reference.

II. General Discussion Items

- Jeff Kivett lead a discussion on how important it is for all parties to know where they are in relationship to the total project budget and schedule at all times. The current project budget (including CDM fees, JV fees, and construction costs) is approximately $184 million. The exact budget amount will be incorporated into the project schedule.
- Bill Taylor discussed the test cell schedule. All parties are aware that time is of the essence and that the test cell must be designed, constructed, and information collected and analyzed prior to completion of the 30 percent design phase (April, 2007). Jeff Kivett informed CDM that the Test Cell Recommendation Memorandum will go to the LRCC for review and they will make their recommendation at their June 7th meeting. If they concurr with CDM's recommendation to construct two test cells, the project will go before the District Board for approval during the July meeting.
- Mark Long will let CDM know the decision of the LRCC on June 7th. If the project is approved by the LRCC, CDM and the Acceler8 team will negotiate a scope and budget that will be ready for approval immediately following the July District Board meeting (assuming Board approval).

- It may be possible to get separate and additional funding for the test cell program. CDM will provide whatever assistance is necessary to help facilitate the process.

- Jeff Kivett discussed the fact that the test cells can not be incorporated into the final reservoir construction. The test cells will be constructed under a special temporary 1502 permit, which explicitly states that the test cell is a temporary facility.

- A general discussion was held regarding the progress of the modeling work to date.

III. Action Items

- Bill Taylor and Mark Long will meet next week to finalize project schedule.

- Bill Taylor and Mark Long will check on which CAD drawings will require "Tri-Services" standards.

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
MONTHLY STATUS REPORT NO. 1
For the Period April 14 to May 17, 2006

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
May 24, 2006

A. Activities Accomplished in the Previous Month

Task 1 Project Management and Coordination

1.1 Project Management

- Project management and coordination activities are on-going.

1.2 QA/QC Plan

- The QA/QC Plan was submitted on May 12th.

1.3 Project Quality Management Meeting

- The meeting summary notes were submitted on April 21st.

1.4 Project Schedule

- CDM was granted access to the CERP zone on May 12th.
- The schedule for the four projects has been framed and we will update later this week.

1.5 Project Work Plan

- The Project Work Plan was submitted on May 15th.

1.6 Critical Path Issues Resolution and Project Technical Meetings

1.7 Progress Review Meeting

1.8 Pre-BODR Critical Criteria Meeting

1.9 Project Stakeholder Briefings

1.10 Water Resources Advisory Committee (WRAC) Briefing

1.11 District Management Technical Review Briefing

1.12 Utility Meetings

1.13 Project Documentation

- The Project Documentation Control Plan was submitted on May 15th.

1.14 GIS Support and Stewardship

- The GIS Data Control Plan was submitted on May 15th.

1.15 District Governing Board Briefing

1.16 Taylor Creek Reservoir Test Cell Recommendation Memorandum

- The draft memorandum was submitted on April 18th. We received comments from the ACCELER8 Team on May 1st. A revised (final) memorandum was submitted on May 18th.
- SPT Boring and Piezocone cross sections completed to date were provided on May 23rd.
- CDM is waiting for a response regarding our recommendations to build two test cells at the Taylor Creek site and possibly one test cell at the Lakeside Ranch site.

Task 2 Surveys

2.1 Review and Prepare Technical Quality Control Requirements and Information

- A meeting was help at the CDM WPB office on May 8th to discuss quality control issues and survey technical requirements.

2.2 Field Survey Effort and Performance

- Kathleen Hall Land Surveying has completed location of aerial targets at Lakeside Ranch (WO 08). They were delayed starting survey at Taylor Creek due to difficulties accessing survey control. They anticipate completion of aerial target surveys at Taylor Creek on May 26th.
- Erdman Anthony has been retained by CDM to help augment the field surveying capabilities of Kathleen Hall Land Surveying.

2.3 Survey Map and Drawing Preparation

- Southern Resource Mapping has started mapping the Lakeside Ranch site.

2.4 AutoCAD Files

- A meeting was held at the ACCELER8 office on May 16th to discuss CAD standards.

2.5 Prepare Survey and Quality Control Reports

Task 3 Hydrogeologic and Geotechnical Field Investigations and Laboratory Testing

3.1 Review and Prepare Technical Quality Control Requirements

- CDM prepared a detailed Work Plan and Quality Assurance/Quality Control (QA/QC) Plan, which was submitted on May 12th.

3.2 Geotechnical Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

- Taylor Creek
  - Six (6) SPT borings (each depth 150 ft-bgs)
  - One (1) SPT boring (60 ft-bgs)
  - Six (6) Piezocone/ CPT borings (depth ranged from 140 to 200 ft-bgs)
  - Two (2) Rotosonic borings (depth 150 ft-bgs and 300 ft-bgs)

- Twenty two (22) piezometers (each depth 17 ft-bgs)
- Six (6) Electrical Resistivity transects (Geophysical)

- Lakeside Ranch
  - Three (3) SPT borings (each depth 150 ft-bgs)
  - Four (4) Piezocones (depth ranged from 137.5 to 150 ft-bgs)
  - Fourteen (14) piezometers (each depth 17.5 ft-bgs)

3.3 Hydrogeological Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

- 36 piezometers have been installed and monitoring has begun.

3.4 Laboratory Testing Services and Analyses

- Several physical index tests have been performed and are under review.

Task 4 Geotechnical Analysis and Design Services

- We have reviewed the information from the borings and piezocones completed to date in conjunction with the Task 3 and Task 5 team members. We set up a SEEP/W cross section seepage model for the north side of the Taylor Creek reservoir site and have performed initial runs for a potential embankment configuration. We have weekly conference calls with the Task 5 groundwater modeling team to coordinate the seepage modeling between the two teams.

4.1 Geotechnical Stability Analyses of Embankments

4.2 Impoundment Seepage and Control System Analyses

4.3 Geotechnical Analyses of Seepage Collection Canal Slopes

4.4 Erosion Protection and Wave Run-up Analyses

4.5 Water Control Structure Foundations

4.6 Geotechnical Report Section

Task 5 Hydrologic, Hydraulic, Water Quality, and Operations Model Evaluations

5.1 Hydrologic, Hydraulic, Water Quality, and Systems Model Evaluation and Recommendations

- The Technical Memorandum is out for QA/QC internal review and will be submitted on May 26th.

5.2 Data Collection and Evaluation

- Data collection and evaluation is on-going.

5.3 Surficial Aquifer Groundwater Model, Seepage, and Mounding Analyses

- Selected the USGS MODFLOW code to develop a subregional model of the project area, which covers an area of approximately 1,100 square miles.

- The modeling grid will be oriented in a north-south orientation with uniform grid cell dimensions of 0.1 miles by 0.1 miles.

- Two local models will be developed from the subregional model, one in the vicinity of Lakeside Ranch and one in the vicinity of the Taylor Creek site. The subregional model will be used to establish boundary conditions for both local models.

- The model will have six layers extending vertically from land surface to the base of the surficial aquifer (top of the intermediate confining unit) at approximately 130 to 150 feet below land surface. The intermediate confining unit is a no flow boundary vertically.

- Lake Okeechobee will be a constant head boundary along the south end of the model, the Kissimmee River is head-dependant boundary on the west and the C-24 and C-25 Canals are head-dependant boundary on the east. A no flow boundary will be used along the northern boundary.

- Site-specific geotechnical and hydrogeologic data were reviewed to determine the model layering.

- Published groundwater elevation data from monitoring wells in the model domain were assembled and reviewed for use in model calibration.

- Published surface water elevation data for the Kissimmee River, Taylor Creek, nubbin Slough and the C-44, C-24, and C-25 Canals were assembled and reviewed for use in determining model boundary conditions.

- Assembled and reviewed NRCS soil survey maps for the model domain for evaluating surface soil characteristics, permeabilities, and depth to seasonal high water table.

- Compiled and reviewed numerous water resources reports on the hydrogeology, modeling, and planning for the project area and region.

- Assembled data needed for baseflow separation analysis for Taylor Creek and the Kissimmee River. The baseflow separation analysis will be performed using the USGS PART software.

- Constructed a preliminary subregional steady-state groundwater flow model using uniform layer top and bottom elevations and aquifer/confining unit characteristics. This model was run with 18 feet of water in the Taylor Creek reservoir and 2 feet of water in the Taylor Creek and Lakeside Ranch STAs. No seepage controls were simulated. The preliminary modeling showed horizontally extensive mounding of groundwater levels near the Taylor Creek Reservoir and much less mounding near the Lakeside Ranch STA.

- Coordinated data and modeling efforts with all of the project team.

5.4 Hydrologic and Hydraulic Models

- CDM has collected the highest resolution topography available, created a digital terrain map (DTM) in GIS, and used the DTM to determine the hydrologic units. This sub-task is nearly complete; however, CDM is attempting to get survey data for the roads in the project area to augment the topography. If/when this data is collected, we will then update the DTM.

- CDM has collected hourly rainfall data for approximately 10 gages in the study area, has analyzed this data for completeness, and has determined that about seven of the gages are useful for the calibration period (June through November, 2004). Some of the gages having gaps of missing data that need to be filled with neighboring data. This has yet to be done. We have the volumes and hydrographs of the design storms ready.

- CDM has collected hourly stage and flow data from the District for gages in the study area for the calibration period. We have requested more stage data and are waiting for a reply.

- CDM is in the process of combining/ examining soils data for the region to determine various infiltration and groundwater parameters for the model. This process is not yet complete.

- We should have the existing land-use from the WAM model. We need to have someone gather both existing and future land-uses for the entire region and combine the data in GIS to 6 types. We can then begin to find DCIA for the hydrologic units.

- The hydrologic parameters for overland flow are being estimated as the hydrologic units are being delineated. Some of these may need to be updated once the land-use has been examined.

- We have tested the GIS method to determine Stage-area relationships. This subtask will be completed soon after the subbasin delineation is complete.

- Conceptually, we know the boundary conditions of the model. These will not be implemented until model setup.

- CDM is in the process of analyzing "as-built" drawings to provide cross-sections for the canals prior to survey so that we may begin to setup and roughly calibrate the model. CDM will use aerial photography and possibly the WAM model to estimate the creeks, this has not been done as of yet. CDM will need to incorporate the surveyed cross-sectional data once the survey is complete.

- CDM is waiting for the survey data and gathering "as-built" data for the initial model. CDM will conduct a field survey of conduits in late May to augment the survey and the as-builts.

- The modelers participated in a SWMM5 workshop to get specific help in setting up the LOFT model in SWMM5.

5.5 Probable Maximum Precipitation and Dam Failure Model

- The methods for PMP estimation were evaluated. The HEC-RAS is recommended for dam break modeling analysis. This software was reviewed among the team members. The data, parameters, approach, potential efforts for using HEC-RAS software to model the dam breaks were discussed. Initial discussion and evaluation of the available methods for determining the locations and dimensions of the possible dam breaches were conducted. Other models are also evaluated for use in this analysis in order to find the best software for the project.

5.6 STA Design Analyses and O&M Plan

- CDM obtained the DMSTA2 model files and supporting documentation and will continue to review the information provided. The model files include example design scenarios with various STA and reservoir configurations. Input parameters and data sources for the DMSTA2 have been identified and will be coordinated with the STELLA model, as necessary.

5.7 Water and Total Phosphorous Budget Analyses

- CDM further refined the initial phosphorus data collected from DBHYDRO for select water quality stations located within the project area. Since the sampling frequency for these stations was highly variable, CDM performed an initial evaluation of the data and began to synthetically extend the time series of actual measured data into a daily time step for use in estimating average annual phosphorus loading from the project area. Various methods for synthesizing data will continue to be used to determine the source of phosphorus inputs to the system and support the preliminary phosphorus loading analysis.

5.8 Watershed, Systems, and Operations Model and Evaluations

- The model used for the water budget analysis is currently being expanded to include more operational flexibility, the Nubbin Slough STAs (even though they are not part of this team's assignment, their operation must be integrally factored into the overall operational analysis of system effectiveness), and phosphorus routing through the entire system. Additionally, the coordination between the operations model, DMSTA2, and other models which will be used in this study has been described schematically.

Task 6 Basis of Design and Report

6.1 Architectural Conceptual Design

6.2 Civil Engineering Analysis and Design

6.3 Structural Engineering Analysis, Conceptual Design, and Report Section

6.4 Mechanical Engineering Analysis, Conceptual Design, and Report Section

6.5 Plumbing Analysis, Conceptual Design, and Report Section
6.6 HVAC Conceptual Design and Report Section
6.7 Fire Protection and Detection Conceptual Design and Report Section
6.8 Electrical Conceptual Design and Report Section
6.9 Instrumentation and Control (I&C) Conceptual Design and Report Section
6.10 Telemetry Conceptual Design and Report Section
6.11 Prepare Draft Operations Plan Report Section Outline
6.12 Conceptual Opinion of Probable Construction Cost and Report Section
6.13 Construction Contract Alternatives
6.14 Permitting Summary and Report Section
6.15 Design Submittals

B. Problems and Present Concerns Encountered in the Project

- Survey Issues – Surveying efforts have been hampered by both the lack of existing control at the Taylor Creek site and the difficulty accessing the existing control. Apparently a special set of keys is required to gain entry to the dikes where the control monumentation is located. These keys will be acquired today but a delay in mapping the geotechnical investigation locations and locating the aerial targets (WO 8) has resulted. The delay in locating the aerial targets may cause delays in the photogrammetric mapping of the topography.

- Test Cell Design and Construction – If the decision is made to follow CDM's recommendation to construct two test cells at the Taylor Creek site (and possibly construct a test cell at the Lakeside Ranch site), the schedule outlined in the Memorandum is recommended. More specifically, it is recommended that CDM receive notice-to-proceed by mid-June. The design, construction, and monitoring of the test cell(s) should be completed by the end of December to provide information prior to the close of the 30 percent phase.

- Water Budget Analysis – CDM provided STELLA modeling data to the ACCELER8 team for review in spreadsheet format. We are waiting for comments to see if there are any issues with using the STELLA model.

C. Planned Activities for the Next Month

- Potentially submit, negotiate, and commence design statement of work for Taylor Creek and/or Lakeside Ranch test cell(s).

- Continue Project Management and Coordination.

- Continue survey work and develop action plan to make up lost time by first week of June.

- Continue geotechnical field investigation and laboratory testing.

- Begin seepage analysis and slope stability evaluations.
- Submit Draft Model Evaluations and Recommendations Technical Memorandum by May 26th.
- Present Model Recommendation Technical Memorandum to IMC by June 9th.
- Submit final Model Recommendation Technical Memorandum by June 16th.
- Continue with Groundwater, Hydraulic, PMP/Dam Break, STA, and Systems/Operations modeling.

D. Updated Project Schedule

- CDM received access last week and framed schedule.
- Schedule will be updated and submitted early next week.

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
Monthly Progress Review Meeting No. 2 Summary

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
June 21, 2006

Attending

Name	Affiliation	Phone Number
Jeff Kivett	Acceler8	561-242-5520
Mark Long	Acceler8	561-242-5520
John Mitnik	SFWMD	561-686-8800
Pat Gleason	CDM	561-689-3336
Bill Taylor	CDM	561-689-3336
Larry Schwartz (call-in)	CDM	407-660-2552
Steve Whiteside (call-in)	CDM	919-787-5620

I. Monthly Status Report

- Bill Taylor reviewed the following items from the Monthly Status Report for the Period May 15 to June 16, 2006:
  - Activities accomplished in the previous month.
  - Problems and present concerns encountered in the Project.
  - Planned activities for the next month.
  - Project Schedule.
- Monthly Status Report No. 2 is attached for reference.

II. General Discussion Items

- John Mitnik led a discussion on the 1502 and 404 permitting requirements. Items discussed included:
  - Bill Taylor presented a draft scope of work for the test cells including permitting.
  - Mark Long would email the electronic application forms in Microsoft Word for the 1502 and 404 permits to Pat Gleason (gleasonpj@cdm.com).
  - Ken Ammon is the signatory on the forms and Carol Wehle is the landowner.
  - NRCS soil maps exist for the site.
  - A pre-application conference with federal and state agencies is necessary to answer a number of questions regarding the site. A significant concern was expressed over the possible presence of the Audubon Caracara on the site by John Mitnik. A T&E survey will most likely be necessary for the site and the magnitude of the effort will be determined at the pre-application meeting. John indicated that the best time for the pre-application meeting would be July 6th at his normal interagency meeting at 11:00 am at the COE's West Palm Beach office. At that time, the interagency group may also request a site visit.

- Wetlands are on the most likely site for the test cells at the north end of the proposed layout of the reservoir. These are highly altered and the interagency meeting will need to address how these will be handled and what will be required.
- It was suggested that CDM not finalize their scope of work until after the pre-application meeting to find out the requirements of the interagency group.
- The layout for the site and the CDM scope for the work involved in the test cells will need to involve not only the actual land area of the test cells but also the staging area. Impacts associated with the staging area will need to be addressed.
- With respect to a T&E survey, the group indicated that possibly some of this was done in the PIR for the site. While leaving the site, Pat Gleason chanced to meet with Tom Teets in the parking lot. Tom indicated that there was no PIR for the site and that there was no existing T&E.
- SFWMD will be the person authorizing access to the property.
- With respect to wet season high water tables, it was indicated by Bill Taylor that Lee Wiseman was reviewing this information and could supply it.
- Soil borings are available for the test cell site.
- Filling of the test cells is an issue and will have to be accomplished via a pipeline from Taylor Creek. This will not change the surface water management system.
- A consumptive use permit will be necessary for the filling of the test cells and this possibly would be an application to the Florida DEP if a consumptive use permit doesn't already exist for the site. CDM will check with the water use permitting staff to determine what consumptive use permits exist for the area. If an existing permit exists, possibly the filling of the test cells could piggy-back on that permit without having to obtain a new permit.
- CDM will also check with the regulation department on what other SFWMD permits such as SWM or ERP have been issued for the site.

▪ Bill Taylor led a discussion with Jeff Kivett and Mark Long regarding the reservoir footprint options. Steve Whiteside was called and provided some insight into the proposed test cell footprint. Steve will forward a site plan for inclusion with the Test Cell SOW the following day (6/22/06).

▪ The Draft Test Cell SOW will be submitted by Mark for technical review on 6/22/06 as soon as he receives the test cell site plan.

▪ Jeff and Mark both agreed that it was time to have a critical path decision-making meeting (workshop). Mark will check on availability of staff. Target date is the first week of August.

III. <u>Action Items</u>

▪ Bill Taylor will confirm permit pre-application meeting with Mark Long.

▪ Bill Taylor and Mark Long will coordinate critical path decision-making meeting.

▪ Pat Gleason will investigate consumptive use permit status for the Taylor Creek site.

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
MONTHLY STATUS REPORT NO. 2
For the Period May 18 to June 16, 2006

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
June 21, 2006

A. Activities Accomplished in the Previous Month

Task 1 Project Management and Coordination

1.1 Project Management

- Project management and coordination activities are on-going.

1.2 QA/QC Plan

- The QA/QC Plan was submitted on May 12th.

1.3 Project Quality Management Meeting

- The meeting summary notes were submitted on April 21st.

1.4 Project Schedule

- The project is currently on-schedule. An updated schedule is attached in Section D of this report.

1.5 Project Work Plan

- The Project Work Plan was submitted on May 15th.

1.6 Critical Path Issues Resolution and Project Technical Meetings

- CDM would like to schedule a meeting in mid-July.

1.7 Progress Review Meeting

- Monthly Status Report No. 1 was presented at the monthly progress review meeting with the District on May 24th.

- Monthly Progress Review Meeting No. 1 Summary was submitted on May 30th.

1.8 Pre-BODR Critical Criteria Meeting

1.9 Project Stakeholder Briefings

1.10 Water Resources Advisory Committee (WRAC) Briefing

1.11 District Management Technical Review Briefing

1.12 Utility Meetings

1.13 Project Documentation

- The Project Documentation Control Plan was submitted on May 15th.

1.14 GIS Support and Stewardship

- The GIS Data Control Plan was submitted on May 15th.

1.15 District Governing Board Briefing

1.16 Taylor Creek Reservoir Test Cell Recommendation Memorandum

- CDM was told by the Acceler8 team on June 14th to prepare a statement of work and budget for the test cell program.

Task 2 Surveys

2.1 Review and Prepare Technical Quality Control Requirements and Information

- Complete.

2.2 Field Survey Effort and Performance

- Kathleen Hall Land Surveying has completely withdrawn from the LOFT project.

- Erdman Anthony has been retained by CDM to complete the remaining field surveying.

2.3 Survey Map and Drawing Preparation

- Southern Resource Mapping has completed mapping the Lakeside Ranch site and has started the Taylor Creek site.

2.4 AutoCAD Files

2.5 Prepare Survey and Quality Control Reports

Task 3 Hydrogeologic and Geotechnical Field Investigations and Laboratory Testing

3.1 Review and Prepare Technical Quality Control Requirements

- CDM prepared a detailed Work Plan and Quality Assurance/Quality Control (QA/QC) Plan, which was submitted on May 12th.

3.2 Geotechnical Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

- Taylor Creek:
  - Ten (10) SPT borings (depth ranged from 60 to 150 ft-bgs)
  - Six (6) CPT borings (depth ranged from 141 to 200.4 ft-bgs)
  - Five (5) Rotosonic borings (depth ranged from 150 to 300 ft-bgs)
  - Twenty two (22) piezometers (each depth 17 ft-bgs)
  - Seven (7) ERI (length ranged from 500 to 1,100 ft)
  - Three (3) GPR intersects
  - Four (4) APT wells (4-in dia.) (depth ranged from 15 to 90.5 ft-bgs)
  - Twenty (20) Observation wells (2-in. dia) (depth ranged from 35 to 90 ft-bgs)

- Six (6) Staff gauges
- Geoprobes: eight (8) depression areas

■ Lakeside Ranch:
  - Five (5) SPT borings (depth ranged from 100 to 150 ft-bgs)
  - Four (4) CPT borings (depth ranged from 137.5 to 150 ft-bgs)
  - Three (3) Rotosonic borings (depth ranged from 150 ft-bgs)
  - Fourteen (14) piezometers (each depth 17.5 ft-bgs)
  - Five (5) ERI (length ranged from 500 to 1,100 ft)
  - Four (4) GPR intersects
  - One (1) APT well (4-in dia.) (each depth 60 ft-bgs)
  - Nine (9) Observation wells (2-in. dia) (depth ranged from 35 to 90 ft-bgs)
  - Seven (7) Staff gauges
  - Geoprobes: five (5) depression areas and fourteen (14) depression points

3.3 Hydrogeological Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

■ 36 piezometers have been installed and monitoring continues.

3.4 Laboratory Testing Services and Analyses

■ Several physical index tests have been performed and are under review.

Task 4 Geotechnical Analysis and Design Services

■ CDM set up a preliminary seepage model for the embankment at Taylor Creek reservoir using SEEP/W. We have evaluated cross sections with and without a cut-off wall.

4.1 Geotechnical Stability Analyses of Embankments

4.2 Impoundment Seepage and Control System Analyses

4.3 Geotechnical Analyses of Seepage Collection Canal Slopes

4.4 Erosion Protection and Wave Run-up Analyses

4.5 Water Control Structure Foundations

4.6 Geotechnical Report Section

Task 5 Hydrologic, Hydraulic, Water Quality, and Operations Model Evaluations

5.1 Hydrologic, Hydraulic, Water Quality, and Systems Model Evaluation and Recommendations

■ The Technical Memorandum was submitted on May 26th. On June 20th, CDM posted the response to comments on DrChecks.

5.2 Data Collection and Evaluation

■ Data collection and evaluation is on-going.

5.3 Surficial Aquifer Groundwater Model, Seepage, and Mounding Analyses

- Extended the regional model domain further to the north (Ft. Drum) and west to include a larger portion of the Kissimmee River Surface Water Basin that better matches the subsurface drainage divides. The revised model represents an area of 1,440 square miles (40 miles by 36 miles) as shown in Figure 1.

- Reviewed all of the available site-specific geotechnical data for incorporation to the groundwater flow model.

- Completed an Aquifer Performance Test Work Plan for the field testing program.

- Designed three aquifer performance tests at Taylor Creek Reservoir (TCR) site and Lakeside Ranch (LR) STA site to determine the hydraulic characteristics of the surficial aquifer system.

- Based on preliminary site-specific geotechnical data, completed the design of twenty one deep piezometers at four locations (*i.e.*, two at TCR site and two at LR STA site) to acquire the field hydraulic conductivity data of the surficial aquifer system.

- Generated current groundwater elevation contour maps for TCR site and LR STA site using site-specific piezometer readings and survey data.

- Visited both the TCR site and LR STA site to verify the depth, width and approximate stage of site surface water features for incorporation into the groundwater flow model.

- Reviewed groundwater level data from nested piezometers at the TCR site to evaluate head differentials between the upper and lower portions of the surficial aquifer. Based on preliminary data, the head gradient is downward, but there appears to be a minimal hydraulic connection between the upper and lower portions of the aquifer.

- Compiled a list of all permitted water users within the model domain.

- Started development of the conceptual groundwater flow model of the surficial aquifer.

- Completed preliminary baseflow separation analysis for Taylor Creek and the Kissimmee River using the USGS PART and RORA software.

- Used the preliminary steady-state groundwater flow model with uniform layer top and bottom elevations and aquifer/confining unit characteristics to evaluate potential seepage from the TCR and LR STAs. No seepage controls were simulated. The preliminary modeling showed horizontally extensive mounding of groundwater levels near the TCR and much less mounding near the LR STA.

- Developed a five layer local groundwater flow model to evaluate the on-site specific capacity tests at TCR and verify the estimation of transmissivity using other analysis methods. Results indicate that the aquifers at the TCR APT site have relatively low values of transmissivity.

- Developed three-dimensional ground surface elevation models for TCR site and LR STA site using DEM and imagery data; and

- Coordinated data and modeling efforts with all of the project team.

5.4 Hydrologic and Hydraulic Models

- CDM has collected the highest resolution topography available, created a digital terrain map (DTM) in GIS, and used the DTM to determine the hydrologic units. The hydrologic units have been delineated; but CDM is still attempting to gather more survey data to help with flows between units. If/when this data is collected, we will then update the DTM.

- CDM has collected hourly rainfall data for approximately 15 gages in the study area, has analyzed this data for completeness, and has determined that about 11 of the gages are useful for the calibration period (June through November, 2004). Some of the gages having gaps of missing data that need to be filled with neighboring data. This has yet to be done. We have the volumes and hydrographs of the design storms ready.

- CDM has evaluated land-use from the land-use data file provided by the district and combined various land-uses into seven types to determine imperviousness, overland roughness and depression storage. This is finished for the existing condition, but needs to be competed for the future condition.

- The hydrologic parameters for overland flow have been estimated from the topography and the land-use files.

- The stage-storage is in the process of being estimated from the digital topography.

- CDM is waiting for the survey data and gathering "as-built" data for the initial model. CDM is in the process of conducting a field survey of conduits in late May to augment the survey and the as-builts.

5.5 Probable Maximum Precipitation and Dam Failure Model

- Reviewed other dam failure analysis models (e.g. DAM BREAK developed by NOAA) and compared them to HEC-RAS. It is concluded that HEC-RAS is suitable for this task but other tool may be needed to simulate the process of dam failures. It is also determined that HEC-GeoRAS will be used for flood inundation analysis.

- Reviewed conceptual design alternatives of the TCR available at this time and discussed the modeling approach best suitable for the task at this site.

- Reviewed other relevant on-site data available at both sites.

- Reviewed the EAP for the FPL's cooling pond located nearby proposed Lakeside Ranch STA area.

- Started development of the preliminary dam-break model for the TCR based on the conceptual design alternative #1. The model includes a portion of Taylor Creek, proposed extension of L63N canal and proposed reservoir. The levee is simulated as a lateral structure. This model should be readily modified to suit for the final design of TCR.

- Coordinated data and modeling efforts with all of the project team.

5.6 STA Design Analyses and O&M Plan

- CDM developed preliminary DMSTA2 model setup runs for Nubbin Slough Critical STA and the Lakeside Ranch STA. Coordination of DMSTA2 with STELLA in terms of time series data needs has been established. DMSTA2 model setup runs are needed for Taylor Creek STA (Grassy Island) Nubbin Slough expansion STA. In order to move forward with development of these DMSTA2 model setup runs, and refinement of the Nubbin Slough Critical STA DMSTA2 model setup runs, the design team needs the BODR, or design plans or as-built construction plans for these systems.

5.7 Water and Total Phosphorous Budget Analyses

- CDM is continuing to synthetically extend the time series of actual measured phosphorus data obtained from DBHYDRO for select water quality stations located within the project area. This measured data will be extended into a daily time step for use in estimating average annual phosphorus loading from the project area for the time periods (1972-1989 and 2004-2005) previously analyzed in the Water Budget Analysis. Various methods for synthesizing data will continue to be used to determine the source of phosphorus inputs to the system and support the preliminary phosphorus loading analysis.

5.8 Watershed, Systems, and Operations Model and Evaluations

- The STELLA model has been updated to include the Nubbin Slough STA, the Nubbin Slough STA Expansion, and a theoretical reservoir at Lakeside Ranch. This theoretical reservoir can be turned on and off for evaluation. The model is also being equipped with a phosphorus tracking module.

- The data transfer between DMSTA and STELLA has been coordinated with the STA team and a workable iterative approach has been agreed upon. Access to the DMSTA macros is needed to fully understand the numerical techniques for phosphorus removal in the STAs prior to transposing those equations into STELLA for a broader operational analysis.

- Coordination with the SWMM/WAM teams in order to understand flow pathways and load points into the system is still needed.

Task 6 Basis of Design and Report

6.1 Architectural Conceptual Design

6.2 Civil Engineering Analysis and Design

6.3 Structural Engineering Analysis, Conceptual Design, and Report Section

6.4 Mechanical Engineering Analysis, Conceptual Design, and Report Section

6.5 Plumbing Analysis, Conceptual Design, and Report Section

6.6 HVAC Conceptual Design and Report Section

6.7 Fire Protection and Detection Conceptual Design and Report Section

6.8 Electrical Conceptual Design and Report Section

6.9 Instrumentation and Control (I&C) Conceptual Design and Report Section

6.10 Telemetry Conceptual Design and Report Section

6.11 Prepare Draft Operations Plan Report Section Outline

6.12 Conceptual Opinion of Probable Construction Cost and Report Section

6.13 Construction Contract Alternatives

6.14 Permitting Summary and Report Section

6.15 Design Submittals

B. Problems and Present Concerns Encountered in the Project

- Need to clarify 1502 and 404 permitting issues related to test cell program.

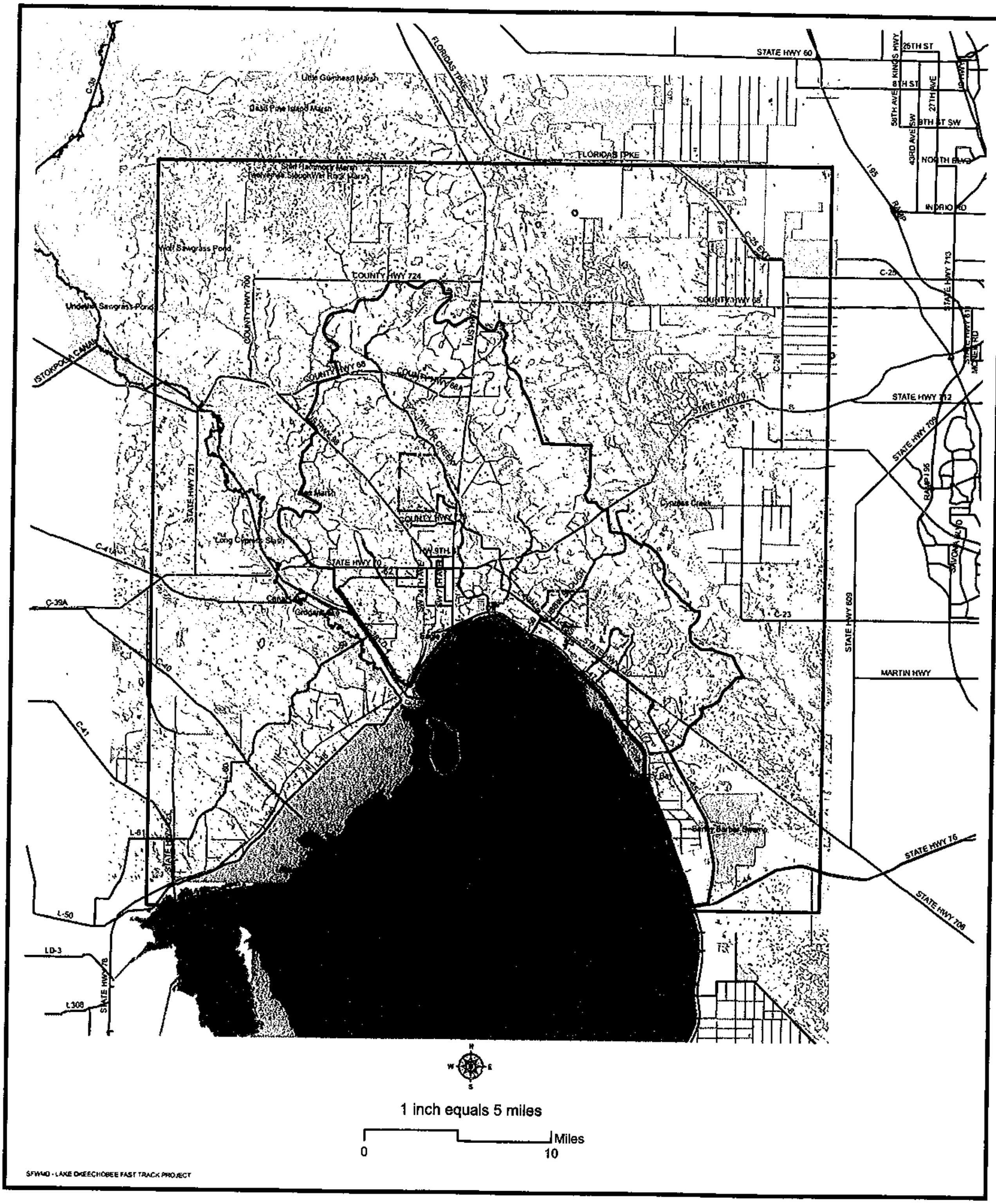
C. Planned Activities for the Next Month

- Negotiate and start Taylor Creek test cell project.
- Continue Project Management and Coordination.
- Continue survey work and submit survey package.
- Continue geotechnical laboratory testing.
- Continue seepage analysis and slope stability evaluations.
- Submit Final Model Evaluations and Recommendations Technical.
- Continue with Groundwater, Hydraulic, PMP/Dam Break, STA, and Systems/Operations modeling.

- Schedule and conduct a Critical Path Decision Making Meeting regarding reservoir configuration and depth.

D. Updated Project Schedule

- Attached



CDM

Figure 1
Groundwater Model Domain

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
Monthly Progress Review Meeting No. 3 Summary

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
July 19, 2006

Attending

Name	Affiliation	Phone Number
Jeff Kivett	Acceler8	561-242-5520
Mark Long	Acceler8	561-242-5520
David Collins	CDM	561-689-3336
Bill Taylor	CDM	561-689-3336

I. Monthly Status Report

- Bill Taylor reviewed the following items from the Monthly Status Report for the Period June 17 to July 14, 2006:
  - Activities accomplished in the previous month.
  - Problems and present concerns encountered in the Project.
  - Planned activities for the next month.
  - Project Schedule.
- Monthly Status Report No. 3 is attached for reference.

II. General Discussion Items

- A discussion was held about the proposed test cell footprint. Jeff and Mark wanted to verify that the proposed locations would fall within the final reservoir footprint. Bill Taylor stated that based on CDM's current thinking, the test cells will most likely fall in the final reservoir footprint. The proposed borrow area may not, but CDM anticipates using that area for mining of embankment soils for the reservoir construction due to the clay content.

- Mark is tracking the T&E issue for the test cell permitting and will advise CDM when more information becomes available.

- Mark and Jeff informed CDM that any activities included in the Test Cell Work Order must be completed by July 28, 2007 due to procurement issues. As a result, the post-construction monitoring tasks will be removed for the time being.

- Bill Taylor stated that all field work for survey and geotechnical investigation has been completed. The survey package deliverable should be submitted by mid-week next week.

- As a follow-up to last month's action items, CDM confirmed that a consumptive use permit will be required for the test cell.

- Jeff suggested that the Taylor Creek site be subdivided along the road when the property survey is conducted.

III. Action Items

- Mark Long will verify what methods should be used to delineate the Taylor Creek and Lakeside Ranch site wetlands.

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
MONTHLY STATUS REPORT NO. 3
For the Period June 16 to July 14, 2006

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
July 19, 2006

A. Activities Accomplished in the Previous Month

Task 1 Project Management and Coordination

1.1 Project Management

- Project management and coordination activities are on-going.

1.2 QA/QC Plan

- Complete.

1.3 Project Quality Management Meeting

- Complete.

1.4 Project Schedule

- The project is currently on-schedule. An updated schedule is attached in Section D of this report.

1.5 Project Work Plan

- Complete.

1.6 Critical Path Issues Resolution and Project Technical Meetings

- Meeting scheduled for August 3rd.

1.7 Progress Review Meeting

- Monthly Status Report No. 2 was presented at the monthly progress review meeting with the District on June 21st.

1.8 Pre-BODR Critical Criteria Meeting

1.9 Project Stakeholder Briefings

1.10 Water Resources Advisory Committee (WRAC) Briefing

1.11 District Management Technical Review Briefing

1.12 Utility Meetings

1.13 Project Documentation

- Document Control Plan complete.

- Files posted to Document as required (on-going).

1.14 GIS Support and Stewardship

- The GIS Data Control Plan complete.

- GIS support is on-going.

1.15 District Governing Board Briefing

1.16 Taylor Creek Reservoir Test Cell Recommendation Memorandum

- Complete.

Task 2 Surveys

2.1 Review and Prepare Technical Quality Control Requirements and Information

- Complete.

2.2 Field Survey Effort and Performance

- All field survey work is complete.

2.3 Survey Map and Drawing Preparation

- Southern Resource Mapping has completed mapping the Lakeside Ranch site and the Taylor Creek.

2.4 AutoCAD Files

- CDM has completed AutoCAD files for Lakeside Ranch survey and cross sections. Taylor Creek files were received today from SRM.

2.5 Prepare Survey and Quality Control Reports

- EA is preparing report for submittal with geotechnical location survey.

Task 3 Hydrogeologic and Geotechnical Field Investigations and Laboratory Testing

3.1 Review and Prepare Technical Quality Control Requirements

- Complete.

3.2 Geotechnical Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

- For the Taylor Creek site, CDM has completed the following work:
  - Ten (10) SPT borings (depth ranged from 60 to 150 ft-bgs)
  - Six (6) CPT borings (depth ranged from 141 to 200.4 ft-bgs)
  - Five (5) Rotosonic borings (depth ranged from 150 to 300 ft-bgs)
  - Twenty two (22) piezometers (each depth 17 ft-bgs)
  - Seven (7) ERI (length ranged from 500 to 1,100 ft)

- Three (3) GPR intersects
- Four (4) APT wells (4-in dia.) (depth ranged from 15 to 90.5 ft-bgs)
- Twenty (20) Observation wells (2-in. dia) (depth ranged from 35 to 90 ft-bgs)
- Six (6) Staff gauges
- Geoprobes: eight (8) depression areas
- Slug Test
- Double-Ring infiltrometer
- APT Deep

■ For the Lakeside Ranch site, CDM has completed the following work:
  - Five (5) SPT borings (depth ranged from 100 to 150 ft-bgs)
  - Four (4) CPT borings (depth ranged from 137.5 to 150 ft-bgs)
  - Three (3) Rotosonic borings (depth ranged from 150 ft-bgs)
  - Fourteen (14) piezometers (each depth 17.5 ft-bgs)
  - Five (5) ERI (length ranged from 500 to 1,100 ft)
  - Four (4) GPR intersects
  - One (1) APT well (4-in dia.) (each depth 60 ft-bgs)
  - Nine (9) Observation wells (2-in. dia) (depth ranged from 35 to 90 ft-bgs)
  - Seven (7) Staff gauges
  - Geoprobes: five (5) depression areas and fourteen (14) depression points
  - Slug test
  - Double-Ring Penetrometer
  - APT Deep and Shallow

3.3 Hydrogeological Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

■ 36 piezometers have been installed and monitoring continues.

3.4 Laboratory Testing Services and Analyses

■ Several physical index tests have been performed and are under review.

Task 4 Geotechnical Analysis and Design Services

4.1 Geotechnical Stability Analyses of Embankments

4.2 Impoundment Seepage and Control System Analyses

■ Developed a preliminary embankment and seepage canal cross section for SEEP/W seepage analyses.

■ Performed preliminary SEEP/W analyses to evaluate seepage conditions with and without a cutoff wall.

4.3 Geotechnical Analyses of Seepage Collection Canal Slopes

4.4 Erosion Protection and Wave Run-up Analyses

4.5 Water Control Structure Foundations

4.6 Geotechnical Report Section

Task 5 Hydrologic, Hydraulic, Water Quality, and Operations Model Evaluations

5.1 Hydrologic, Hydraulic, Water Quality, and Systems Model Evaluation and Recommendations

- CDM completed the Draft Model Evaluations and Recommendations Technical Memorandum (TM), submitted it for IMC review, and responded to all IMC comments in DrChecks. All comments were considered addressed by IMC since they were clarifications and explanations. The comments are identified as closed in DrChecks except for CDM's review of the IMC peer-review of the WAMView model for daily flows and TP loads. The IMC has determined that no presentation of the TM is necessary, and since the comments constitute the final TM (since these were clarifications to questions), the following deliverables are considered complete:
  - 5.1.1 Draft Model Evaluations and Recommendations Technical Memorandum
  - 5.1.2 Presentation of the TM to the IMC
  - 5.1.3 Final Model Evaluations and Recommendations Technical Memorandum

- CDM will provide brief review comments to IMC's peer review of the WAMView model when it is made available.

5.2 Data Collection and Evaluation

- Data collection and evaluation is on-going.

5.3 Surficial Aquifer Groundwater Model, Seepage, and Mounding Analyses

- Modeling work continues.

5.4 Hydrologic and Hydraulic Models

- 5.4.1 Hydrologic Units and Topography: CDM has collected the highest resolution topography available, created a digital terrain map (DTM) in GIS, and used the DTM to determine the hydrologic units. This sub-task is complete.

- 5.4.2 Rainfall and Design Storms: CDM has collected hourly rainfall data for approximately 15 gages in the study area, has analyzed this data for completeness, and has determined that about 11 of the gages are useful for the calibration period (June through November 2004). This sub-task is complete.

- 5.4.3 Stage and Discharge Data: CDM has collected hourly stage and flow data from the District for gages in the study area for the calibration period. The data collection is complete, and CDM will continue implementing the calibration stages in the model and analyzing this data.

- 5.4.4 Soils Data: CDM has completed the task of combining/examining soils data for the region to determine various infiltration and groundwater parameters for the model.

- 5.4.5 Land Use and Impervious Areas: CDM has evaluated land-use from the land-use data file provided by the district and combined various land-uses into seven types to determine imperviousness, overland roughness and depression storage. This is finished for the existing condition, but needs to be competed for the future condition.

- 5.4.6 Overland Flow Data: The hydrologic parameters for overland flow have been estimated from the topography and the land-use files.

- 5.4.7 Stage-Area-Storage: The stage-storage has been estimated from the digital topography.

- 5.4.8 Boundary Conditions: CDM has started to implement the model boundary conditions. This process will be further developed during calibration.

- 5.4.9 Cross-section Data: CDM has analyzed "as-builit" drawings to provide cross-sections for the canals prior to survey so that we may begin to setup and roughly calibrate the model. CDM used aerial photography and some site investigation to estimate the creeks. CDM is in the process of incorporating the surveyed cross-sectional data as it is completed.

- 5.4.10 Conduit and Control Structure Data: CDM is incorporating the survey data as it arrives. CDM conducted field surveys of conduits to augment the land surveys and the "as-built" data.

- 5.4.11 Model Setup and Calibration: The model setup will not be completed until all the survey data has been supplied. CDM has started initial calibration procedures with the model "as-is."

- 5.4.12 Design Storm and PMP Simulations: We have tested the model with the Probable Maximum Precipitation and found that many of the channel links (not the main channels, but tributary links) were insufficient causing very high stages in some nodes (up to 70 ft above land el.). We are in the process of going back through the model and adding wide floodplains to the links and then removing this storage from the stage-storage relationships. It has been time consuming, but better now than after we have a calibrated model.

5.5 Probable Maximum Precipitation and Dam Failure Model

- Reviewed PMP evaluation theory, procedures, and relevant data in the area;

- Reviewed conceptual design alternatives of the Taylor Creek Reservoir available at this time and discussed the modeling approach best suitable for the task at this site;

- Reviewed other relevant on-site data available at both sites.
- Reviewed the EAP for the FPL's cooling pond located nearby proposed Lakeside Ranch STA area.
- A preliminary dam-break HEC-RAS model was developed for the Taylor Creek Reservoir (TCR) based on the conceptual design alternative #1. The model includes a portion of Taylor Creek and proposed reservoir. The levee was simulated as a lateral structure. The total simulation time is 24 hours and a one-hour dam break scenario was simulated to the east side of the proposed TCR. This model should be readily modifiable to suit for the final design of TCR.
- A realistic dam break scenario, the possible size and duration of the dam failure, is being developed using the NOAA "BREACH" model methodology. These more realistic inputs will be used in HEC-RAS for the dam-break analysis.
- Coordinated data and modeling efforts with all of the project team.

5.6 STA Design Analyses and O&M Plan

- CDM continued to develop preliminary DMSTA2 model setup runs for Nubbin Slough STAs, the Lakeside Ranch STA, and Taylor Creek Reservoir and STA. CDM continued work on developing an approach to track DMSTA2 phosphorus removal results in STELLA. A DRAFT memorandum on Lakeside Ranch STA Conceptual Alternatives was developed. The Lakeside Ranch STA design team was determined and began processing survey data. CDM began an evaluation of Hydromentia technology.

5.7 Water and Total Phosphorous Budget Analyses

- CDM has completed synthetically extending the time series of actual measured phosphorus data obtained from DBHYDRO for select water quality stations located within the project area. This measured data was extended into a daily time step for use in estimating average annual phosphorus loading from the project area for the time periods (1972-1989 and 2004-2005) previously analyzed in the Water Budget Analysis. CDM is continuing to develop the phosphorus mass balance portion of the STELLA model which will use as an input the phosphorus data synthesized during this task to support the preliminary phosphorus loading analysis.

5.8 Watershed, Systems, and Operations Model and Evaluations

- Added alternative flow paths to STELLA model for various configurations of Taylor Creek Reservoir and routing of LD-4 water (into L63S or L47).
- Began building the phosphorus routing sub-model. The sub-model is a parallel model to the flow model, which associates phosphorus loads with every flow.
- Conducted several tests of basic methodologies to replicate the phosphorus decay

dynamics of DMSTA in STELLA. This requires further development with the DMSTA team.

- Developed a diagram specifically to coordinate WAM output with STELLA input.
- After several discussions with the SFWMD, it was determined that the model will continue to be developed in STELLA. Additionally, selected excerpts of the final model will be translated into a spreadsheet for SFWMD review.

Task 6 Basis of Design and Report

6.1 Architectural Conceptual Design

6.2 Civil Engineering Analysis and Design

- A reservoir configuration memo has been drafted and reviewed by CDM and will be submitted to the District next week.

6.3 Structural Engineering Analysis, Conceptual Design, and Report Section

6.4 Mechanical Engineering Analysis, Conceptual Design, and Report Section

6.5 Plumbing Analysis, Conceptual Design, and Report Section

6.6 HVAC Conceptual Design and Report Section

6.7 Fire Protection and Detection Conceptual Design and Report Section

6.8 Electrical Conceptual Design and Report Section

6.9 Instrumentation and Control (I&C) Conceptual Design and Report Section

6.10 Telemetry Conceptual Design and Report Section

6.11 Prepare Draft Operations Plan Report Section Outline

6.12 Conceptual Opinion of Probable Construction Cost and Report Section

6.13 Construction Contract Alternatives

6.14 Permitting Summary and Report Section

6.15 Design Submittals

B. Problems and Present Concerns Encountered in the Project

- Need to clarify 1502 and 404 permitting issues related to test cell program.

C. Planned Activities for the Next Month

- Negotiate and start Taylor Creek test cell project.
- Attend Critical Path Decision Making Meting on August 3rd.
- Submit survey package (Task 2.1).
- Submit field investigation results (Task 3.1).
- Draft Water and Total Phosphorus Budget Report Section (Task 5.7.1).

- Continue Project Management and Coordination.
- Continue geotechnical laboratory testing.
- Continue seepage analysis and slope stability evaluations.
- Continue with Groundwater, Hydraulic, PMP/Dam Break, STA, and Systems/Operations modeling.

D. Updated Project Schedule

- Attached

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
Monthly Progress Review Meeting No. 4 Summary

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
August 16, 2006

Attending

Name	Affiliation	Phone Number
Jeff Kivett	Acceler8	561-242-5520
Mark Long	Acceler8	561-242-5520
Bill Taylor	CDM	561-689-3336
Dave Collins	CDM	561-689-3336

I. Monthly Status Report

- Bill Taylor reviewed the following items from the Monthly Status Report for the Period July 15 to August 11, 2006:
  - Activities accomplished in the previous month.
  - Problems and present concerns encountered in the Project.
  - Planned activities for the next month.
  - Project Schedule.

- Monthly Status Report No. 4 is attached for reference.

II. General Discussion Items

- A discussion was held about the phosphorus loads for future conditions (2010) as revised for the Lake Okeechobee Protection Plan. A conference call with Dave Unsell and others to discuss the report will be scheduled later in the week. For now, CDM is proceeding with our SOW as written.

- Jeff inquired as to why CDM wanted the drawings for STA 1E. Bill stated that an elevation change at the 1E site is similar to that at the Lakeside Ranch site and CDM was interested to see how it was handled at 1E.

- Mark suggested that we set up another meeting with District headquarters operations managers to discuss progress to date and review items of concerns that we discussed at the previous meeting.

- Mark and Bill agreed that there are still some wetlands and T&E issues which should be resolved quickly. CDM and the District must negotiate a task order and start this work soon to avoid an adverse impact to both the Test Cell and main projects.

III. Action Items

- Mark Long will have a follow up discussion with John Mitnik regarding permitting issues.
- Bill Taylor will send Mark the SOW for wetland evaluations ASAP.
- A conference call to discuss the revised phosphorus loads will be scheduled ASAP.
- A site visit/kick off meeting for the test cell project has been scheduled for August 21.
- A Project Quality Meeting for the Test Cell has been scheduled for August 22.

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
MONTHLY STATUS REPORT NO. 4
For the Period July 15 to August 11, 2006

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
August 16, 2006

A. Activities Accomplished in the Previous Month

Task 1 Project Management and Coordination

1.1 Project Management
- Project management and coordination activities are on-going.

1.2 QA/QC Plan
- Complete.

1.3 Project Quality Management Meeting
- Complete.

1.4 Project Schedule
- The project is currently on-schedule. An updated schedule is attached in Section D of this report.

1.5 Project Work Plan
- Complete.

1.6 Critical Path Issues Resolution and Project Technical Meetings
- CDM presented several configuration options for the Taylor Creek Reservoir as well as the Lakeside Ranch STA at the Critical Path Decision Making Meeting on August 3rd.

- A summary of the meeting was presented to the district on August 8th.

1.7 Progress Review Meeting
- Monthly Status Report No. 3 was presented at the monthly progress review meeting with the District on July 19th.

1.8 Pre-BODR Critical Criteria Meeting

1.9 Project Stakeholder Briefings

1.10 Water Resources Advisory Committee (WRAC) Briefing

1.11 District Management Technical Review Briefing

1.12 Utility Meetings

1.13 Project Documentation

- Document Control Plan complete.
- Files posted to Document as required (on-going).

1.14 GIS Support and Stewardship

- The GIS Data Control Plan complete.
- GIS support is on-going.

1.15 District Governing Board Briefing

1.16 Taylor Creek Reservoir Test Cell Recommendation Memorandum

- Complete.

Task 2 Surveys

2.1 Review and Prepare Technical Quality Control Requirements and Information

- Complete.

2.2 Field Survey Effort and Performance

- All field survey work is complete.

2.3 Survey Map and Drawing Preparation

- Complete.

2.4 AutoCAD Files

- CDM has completed AutoCAD files for the Lakeside Ranch and Taylor Creek surveys and cross sections.

2.5 Prepare Survey and Quality Control Reports

- EA is preparing report for submittal with geotechnical location survey.

Task 3 Hydrogeologic and Geotechnical Field Investigations and Laboratory Testing

3.1 Review and Prepare Technical Quality Control Requirements

- Complete.

3.2 Geotechnical Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

- Complete.

3.3 Hydrogeological Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

- 36 piezometers have been installed and monitoring continues.

3.4 Laboratory Testing Services and Analyses

- Several physical index tests have been performed and are under review.

Task 4 Geotechnical Analysis and Design Services

4.1 Geotechnical Stability Analyses of Embankments

4.2 Impoundment Seepage and Control System Analyses

- Reviewed and evaluated the data from the field investigations
- Reviewed and evaluated laboratory test results.
- Developed subsurface cross sections at Taylor Creek reservoir for use in seepage analyses, in concert with Task 5 groundwater modeling members.
- Performed additional seepage analyses.
- Began preparation of draft report.

4.3 Geotechnical Analyses of Seepage Collection Canal Slopes

- Began preparation of draft report.

4.4 Erosion Protection and Wave Run-up Analyses

- Performed wave run-up analyses.
- Began preparation of draft report.

4.5 Water Control Structure Foundations

4.6 Geotechnical Report Section

Task 5 Hydrologic, Hydraulic, Water Quality, and Operations Model Evaluations

5.1 Hydrologic, Hydraulic, Water Quality, and Systems Model Evaluation and Recommendations

- CDM is working to incorporate the final Dr. Checks comments and produce the final Technical Memorandum.

5.2 Data Collection and Evaluation

- Data collection and evaluation is on-going.

5.3 Surficial Aquifer Groundwater Model, Seepage, and Mounding Analyses

The following is a summary of the decisions and accomplishments that occurred during the fourth month since project notice-to-proceed:

- Continuously developing the regional groundwater flow model. The surface water bodies (i.e., lakes, rivers, ponds, creeks, canals, drainage ditches, sloughs) and land surface elevations were incorporated into the model based on the site-specific survey data, USGS quads and DEM data;
- Evaluated all of the available site-specific geotechnical data and laboratory testing data to update the groundwater flow model (i.e., layering, hydrogeological

properties);

- Completed one Aquifer Performance Test (APT) at Lakeside Ranch STA site (LR STA) and two APT at Taylor Creek Reservoir site (TCR);

- Evaluated three APT testing results to determine the hydraulic characteristics of the surficial aquifer system;

- Based on the site-specific geotechnical data, prepared a field guidelines for thirty one slug tests at fourteen locations (i.e., eight at TCR site and six at LR STA site) to acquire the field hydraulic conductivity data in the different units of the surficial aquifer system;

- Updated groundwater elevation contour maps for TCR site and LR STA site using latest site-specific groundwater water readings at piezometers;

- Compiled offsite 50 monitoring wells, 187 staff gauges and 163 permitted water users with about 500 pumping wells within the model domain based on SFWMD and USGS databases for the model calibration;

- Completed a technical memorandum of baseflow separation analyses for Taylor Creek and the Kissimmee River using the USGS PART and RORA software, and modeling evaluation of field specific capacity tests at TCR and LR STA;

- Coordinated data and modeling efforts with all of the project teams.

5.4 Hydrologic and Hydraulic Models

- 5.4.1 Hydrologic Units and Topography: CDM has collected the highest resolution topography available, created a digital terrain map (DTM) in GIS, and used the DTM to determine the hydrologic units. This sub-task is complete.

- 5.4.2 Rainfall and Design Storms: CDM has collected hourly rainfall data for approximately 15 gages in the study area, has analyzed this data for completeness, and has determined that about 11 of the gages are useful for the calibration period (June through November 2004). This sub-task is complete.

- 5.4.3 Stage and Discharge Data: CDM has collected hourly stage and flow data from the District for gages in the study area for the calibration period. The data collection is complete, and CDM will continue implementing the calibration stages in the model and analyzing this data. This sub-task is complete.

- 5.4.4 Soils Data: CDM has completed the task of combining/examining soils data for the region to determine various infiltration and groundwater parameters for the model.

- 5.4.5 Land Use and Impervious Areas: CDM has evaluated land-use from the land-use data file provided by the district and combined various land-uses into seven types to determine imperviousness, overland roughness and depression storage. This is finished for the existing condition, but needs to be competed for the future condition.

- 5.4.6 Overland Flow Data: The hydrologic parameters for overland flow have been estimated from the topography and the land-use files.

- 5.4.7 Stage-Area-Storage: The stage-storage has been estimated from the digital topography.

- 5.4.8 Boundary Conditions: This sub-task is complete.

- 5.4.9 Cross-section Data: CDM has completed the process of incorporating the surveyed cross-sectional data into the model.

- 5.4.10 Conduit and Control Structure Data: CDM has completed incorporating the surveyed conduit and control sturcutre data into the model.

- 5.4.11 Model Setup and Calibration: CDM has calibrated the model to Hurricanes Frances and Jeanne, from September through October 2004. Some slight modifications are still to be made.

- 5.4.12 Design Storm and PMP Simulations: CDM has started production simulations for the design storms under the existing conditions.

- 5.4.13 Evaluate LOFT Project Components and Size Design Structures: CDM has started the evaluation of the routing to Lakeside Ranch in order to test the capacity of the L-64 Canal.

5.5 Probable Maximum Precipitation and Dam Failure Model

- A preliminary dam-break HEC-RAS model was developed for the Taylor Creek Reservoir (TCR) based on the conceptual design alternatives. The model includes a portion of Taylor Creek and proposed reservoir. The dam was simulated as an inline structure. The total simulation time is 24 hours and a one-hour dam break scenario was simulated on the approximated location of the proposed TCR. This model should be readily modifiable to suit for the final design of TCR. Analysis of the results obtained from preliminary model runs indicates that further work on the model is needed.

- Members of the team created a TIN in GIS for use with HEC-GeoRAS. This will facilitate the transfer of the model between HEC-RAS and HEC-GeoRAS and allow for flood inundation mapping if necessary.

- Coordinated data and modeling efforts with all of the project team.

5.6 STA Design Analyses and O&M Plan

- CDM continued to develop preliminary DMSTA2 model setup runs for Nubbin Slough STAs, the Lakeside Ranch STA, and Taylor Creek Reservoir and STA. CDM continued to develop an approach to track DMSTA2 phosphorus removal results in STELLA for STAs, reservoirs and Algal Turf Scrubber (ATS) technology. The DRAFT memorandum on Lakeside Ranch STA Conceptual Alternatives was revised to address civil design and hydraulic constraints for the STA related to large differences in the existing site elevation. The Lakeside Ranch STA design team continued processing survey data. The team also continued their evaluation of Hydromentia technology.

5.7 Water and Total Phosphorous Budget Analyses

- CDM has completed synthetically extending the time series of actual measured phosphorus data obtained from DBHYDRO for select water quality stations located within the project area. This measured data was extended into a daily time step for use in estimating average annual phosphorus loading from the project area for the time periods (1972-1989 and 2004-2005) previously analyzed in the Water Budget Analysis. CDM has submitted a deliverable (Section 9 of the BODR) to the District summarizing the initial findings of this task. This deliverable will be updated in the coming months to include a summary of the water and phosphorus budgets analyzed in STELLA. The WAM flow rates and phosphorus data from 1965-2005 will serve as input into the final STELLA operational analysis, in which the entire system will be evaluated for phosphorus removal potential.

5.8 Watershed, Systems, and Operations Model and Evaluations

- Flow logic has been completed.
- Phosphorus routing logic has been completed.
- STA decay relationships have been identified and are currently being tested.
- Preliminary runs using available data were presented to client and support the assertion that there is sufficient water for the system.
- First QA task completed - units in model thoroughly checked.

Task 6 Basis of Design and Report

6.1 Architectural Conceptual Design

6.2 Civil Engineering Analysis and Design

- A reservoir configuration memo has been presented to the District.

6.3 Structural Engineering Analysis, Conceptual Design, and Report Section

6.4 Mechanical Engineering Analysis, Conceptual Design, and Report Section

6.5 Plumbing Analysis, Conceptual Design, and Report Section

6.6 HVAC Conceptual Design and Report Section

6.7 Fire Protection and Detection Conceptual Design and Report Section

6.8 Electrical Conceptual Design and Report Section

6.9 Instrumentation and Control (I&C) Conceptual Design and Report Section

6.10 Telemetry Conceptual Design and Report Section

6.11 Prepare Draft Operations Plan Report Section Outline

6.12 Conceptual Opinion of Probable Construction Cost and Report Section

6.13 Construction Contract Alternatives

6.14 Permitting Summary and Report Section

6.15 Design Submittals

B. Problems and Present Concerns Encountered in the Project

- CDM needs to receive copies of the STA 1 East design drawings ASAP.

C. Planned Activities for the Next Month

- Submit Draft Seepage and Control Report Section.
- Submit Draft Seepage Canal Analysis Report Section.
- Submit Draft Wave Run-up and Erosion Protection Report Section.
- Attend CCM.
- Submit Laboratory Test Data and Results.
- Continue Project Management and Coordination.
- Submit Draft Hydraulic Model Analysis Report Section.
- Submit Draft STA Design Analysis Report Section.
- Submit Draft Watershed, Systems and Operations Model and Evaluations Report Section.
- Submit Draft PMP/Dam Break Survey Report Section.

D. Updated Project Schedule

- Attached

LAKE OKEECHOBEE FAST TRACK (LOFT) PROJECT - BODR
Work Order No.: CN040926-WO10
MONTHLY STATUS REPORT NO. 5
For the Period August 12 to September 15, 2006

South Florida Water Management District
In Cooperation with CDM
CDM Project No. 30327-51606-009
September 20, 2006

A. Activities Accomplished in the Previous Month

Task 1 Project Management and Coordination

1.1 Project Management
- Project management and coordination activities are on-going.

1.2 QA/QC Plan
- Complete.

1.3 Project Quality Management Meeting
- Complete.

1.4 Project Schedule
- The project is currently on-schedule. An updated schedule is attached in Section D of this report.

1.5 Project Work Plan
- Complete.

1.6 Critical Path Issues Resolution and Project Technical Meetings
- CDM presented several configuration options for the Taylor Creek Reservoir as well as the Lakeside Ranch STA at the Critical Path Decision Making Meeting on August 3rd.
- A summary of the meeting was presented to the district on August 8th.

1.7 Progress Review Meeting
- Monthly Status Report No. 4 was presented at the monthly progress review meeting with the District on August 16.

1.8 Pre-BODR Critical Criteria Meeting

1.9 Project Stakeholder Briefings

1.10 Water Resources Advisory Committee (WRAC) Briefing

1.11 District Management Technical Review Briefing

1.12 Utility Meetings

1.13 Project Documentation
- Document Control Plan complete.
- Files posted to Documentum as required (on-going).

1.14 GIS Support and Stewardship
- The GIS Data Control Plan complete.
- GIS support is on-going.

1.15 District Governing Board Briefing

1.16 Taylor Creek Reservoir Test Cell Recommendation Memorandum
- Complete.

Task 2 Surveys

2.1 Review and Prepare Technical Quality Control Requirements and Information
- Complete.

2.2 Field Survey Effort and Performance
- All field survey work is complete.

2.3 Survey Map and Drawing Preparation
- Complete.

2.4 AutoCAD Files
- CDM has completed AutoCAD files for the Lakeside Ranch and Taylor Creek surveys and cross sections.

2.5 Prepare Survey and Quality Control Reports
- Complete.

Task 3 Hydrogeologic and Geotechnical Field Investigations and Laboratory Testing

3.1 Review and Prepare Technical Quality Control Requirements
- Complete.

3.2 Geotechnical Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA
- Complete.

3.3 Hydrogeological Field Investigations for Taylor Creek Reservoir and Lakeside Ranch STA

- 36 piezometers have been installed and monitoring continues.

3.4 Laboratory Testing Services and Analyses

- Complete.

Task 4 Geotechnical Analysis and Design Services

4.1 Geotechnical Stability Analyses of Embankments

4.2 Impoundment Seepage and Control System Analyses

- Performed SEEP/W, SLOPE/W, and settlement analyses.

4.3 Geotechnical Analyses of Seepage Collection Canal Slopes

- Performed analyses.

4.4 Erosion Protection and Wave Run-up Analyses

- Performed wave run-up analyses.

4.5 Water Control Structure Foundations

4.6 Geotechnical Report Section

- Submitted draft Task 4 report.

Task 5 Hydrologic, Hydraulic, Water Quality, and Operations Model Evaluations

5.1 Hydrologic, Hydraulic, Water Quality, and Systems Model Evaluation and Recommendations

- Complete.

5.2 Data Collection and Evaluation

- Complete.

5.3 Surficial Aquifer Groundwater Model, Seepage, and Mounding Analyses

The following is summary of the decisions and accomplishments that occurred during the fifth month since project notice-to-proceed:

- Coordinated data and modeling efforts with all of the project teams;
- Made final revisions to model aquifer hydraulic properties;
- Calibrated groundwater flow model using onsite and offsite monitoring well data as well as baseflow estimates;
- Completed model runs with and without seepage controls;

- Participated in a detailed technical review of the modeling; and

- Continued to prepare the documentation describing the modeling.

5.4 Hydrologic and Hydraulic Models

- 5.4.10 Conduit and Control Structure Data: CDM has completed incorporating the surveyed conduit and control structure data into the model.

- 5.4.11 Model Setup and Calibration: CDM has calibrated the model to Hurricanes Frances and Jeanne, from September through October 2004.

- 5.4.12 Design Storm and PMP Simulations: CDM has completed production simulations for the design storms under the existing condition and under project conditions and compared the results.

- 5.4.13 Evaluate LOFT Project Components and Size Design Structures: CDM has evaluated of the routing to Lakeside Ranch in order to test the capacity of the L-64 Canal. CDM has used SWMM to evaluate flow through Lakeside Ranch, to test for cell slope and potential structure operation. CDM has also used SWMM to test components around the Taylor Creek Reservoir

5.5 Probable Maximum Precipitation and Dam Failure Model

- CDM has developed a HEC-RAS dambreak model simulating a southern PMP breach for TCR configuration 2b.

- CDM has developed a HEC-RAS dambreak model simulating a western PMP breach for TCR configuration 2b.

- CDM has developed a HEC-RAS dambreak model simulating a western PMP breach for TCR configuration 3a.

5.6 STA Design Analyses and O&M Plan

- CDM continued to develop preliminary DMSTA2 model setup runs for Nubbin Slough STAs, the Lakeside Ranch STA, and Taylor Creek Reservoir and STA. We continued to develop approach to track DMSTA2 phosphorus removal results in STELLA for STAs, reservoirs and Algal Turf Scrubber (ATS) technology. We revised the DRAFT memorandum on Lakeside Ranch STA Conceptual Alternatives to address civil design and hydraulic constraints for the STA related to large differences in the existing site elevation. We developed the draft STA report for the BODR to be submitted on September 22, 2006.

5.7 Water and Total Phosphorous Budget Analyses

- Complete.

5.8 Watershed; Systems, and Operations Model and Evaluations

- Finalized phosphorus routing model.
- Refined STA hydraulics and operating rules.
- Developed phosphorus decay model based on simplified DMSTA approach.

Task 6 Basis of Design and Report

6.1 Architectural Conceptual Design

- RCT Engineering has started this work.

6.2 Civil Engineering Analysis and Design

- A reservoir configuration memo has been presented to the District.
- An STA configuration memo has been prepared.

6.3 Structural Engineering Analysis, Conceptual Design, and Report Section

- RCT Engineering has started this work.

6.4 Mechanical Engineering Analysis, Conceptual Design, and Report Section

- Visited existing PS S-133 and Nubbin Slough STA PS, and proposed sites of four of the PSs.
- Developed preliminary design criteria for the proposed five pump stations.
- Contacted pump vendors and received input on the four submersible pump applications.
- Prepared presentation materials for September 21st workshop.
- Started preparation of Mechanical section of draft BODR.

6.5 Plumbing Analysis, Conceptual Design, and Report Section

- RCT Engineering has started this work.

6.6 HVAC Conceptual Design and Report Section

- RCT Engineering has started this work.

6.7 Fire Protection and Detection Conceptual Design and Report Section

- RCT Engineering has started this work.

6.8 Electrical Conceptual Design and Report Section

- CDM has started this work.

6.9 Instrumentation and Control (I&C) Conceptual Design and Report Section

- CDM has started this work.

6.10 Telemetry Conceptual Design and Report Section

- CDM has started this work.

6.11 Prepare Draft Operations Plan Report Section Outline

- CDM has started this work.

6.12 Conceptual Opinion of Probable Construction Cost and Report Section

- CDM has started this work.

6.13 Construction Contract Alternatives

- CDM has started this work.

6.14 Permitting Summary and Report Section

- CDM has started this work.

6.15 Design Submittals

- CDM has started this work.

B. Problems and Present Concerns Encountered in the Project

-

C. Planned Activities for the Next Month

- Attend CCM.
- Continue Project Management and Coordination.
- Submit Draft Hydraulic Model Analysis Report Section.
- Submit Draft STA Design Analysis Report Section.
- Submit Draft Watershed, Systems and Operations Model and Evaluations Report Section.
- Submit Draft PMP/Dam Break Survey Report Section.

D. Updated Project Schedule

- Attached